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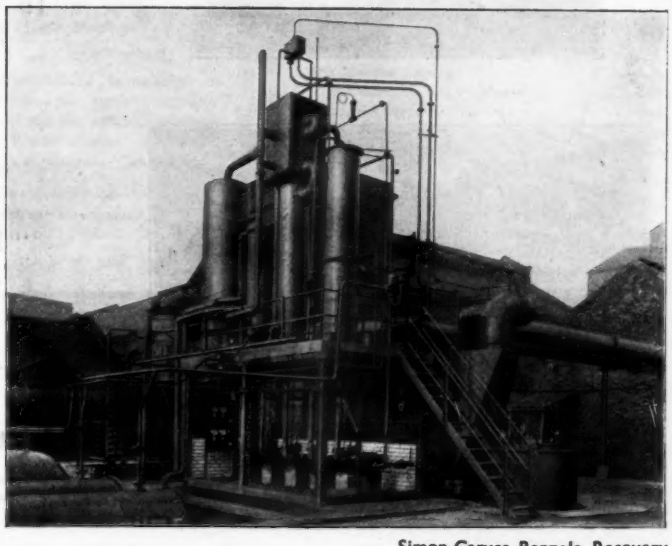

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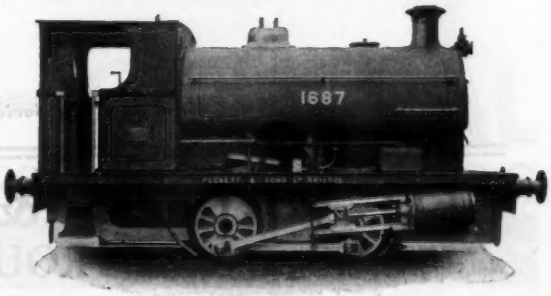

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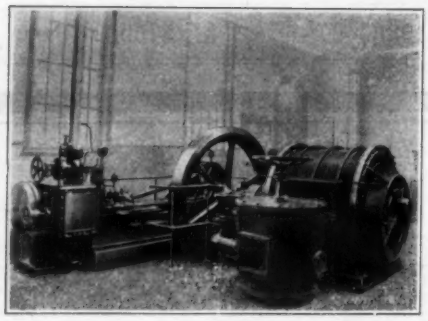

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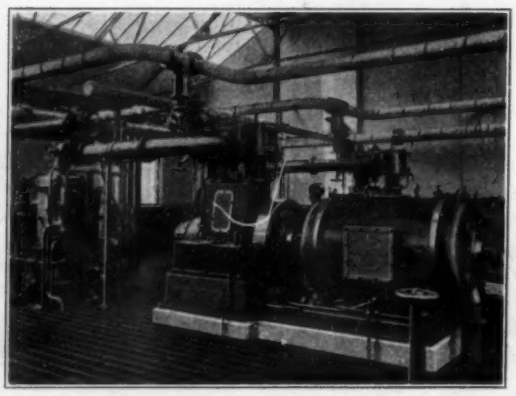

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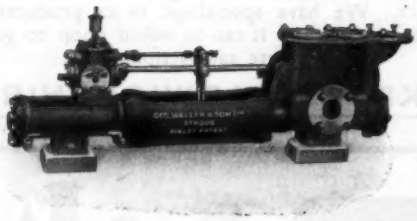

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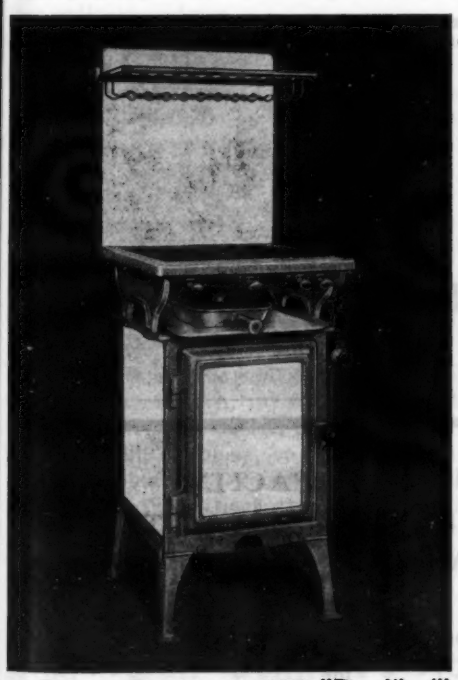

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Gas Journal

JUNE 5, 1935

Vol. 210. 87th Year No. 3759.

Editorial Notes

Institution Week

By the time these lines reach our readers, already the major portion of the business proceedings at the Institution Meeting will have been completed, and the period of comparative peace between the production of our two Institution numbers will have passed. This interval is no fool's paradise for us, because long experience leaves us in no doubt whatever as to the violence of the storm, from the journalistic point of view, which is about to break upon us in Institution Week proper. And a study of such cyclones and anti-cyclones as have been available this year for observation in the shape of the Papers to be read and the Official Programme permit of only one forecast—that the storm will, if possible, be of even more than ordinary violence.

In our First Institution Number last week we published lengthy abstracts of all the Papers in the Programme; those who have received them *in extenso* in the admirable Blue Books published by the Institution will have realized something of the work involved in their authorship and editing, and will undoubtedly agree with our comment—a hardy annual one—that they are longer than ever.

Our Second Institution Number next week will place on record, in full, Mr. Valon Bennett's Presidential Address, Dr. Glasgow's Lecture on "The Tactical Use of Carburetted Water Gas as a Coal Gas Auxiliary," and our customary full report of the various discussions. And in addition there will be our usual account of the social activities which, in fact, constitute such an important, as well as pleasant, part of the Annual Meeting. A feature will, of course, be our Review, so popular as a means of obtaining a comprehensive view of the week's proceedings. We particularly commend this to those who complain that they have not the time to read a normal Institution Number, and we would emphasize the technical value of the summaries of the Papers and Discussions which are included in it.

Mr. Valon Bennett's Address

As we go to press, enough has transpired to convince us that the President, Mr. Valon Bennett, must feel gratified with the success the Meeting has already achieved, and in particular, perhaps, with the reception accorded his Address and the interest it has aroused. We have heard many comments on this Address, which to our mind is of a very high standard, and all the comments show that those fortunate enough to attend the Meeting share our view in this respect. In the restless times through which the Gas Industry is at present passing it is no easy task for a leader of the Industry, as President of the Institution, to survey all the complex activities broadly and clearly in an attempt to offer guidance and confirm the faith of its members in its future strength and prosperity. Events are moving with unwonted rapidity, for which reason alone Mr. Bennett's well-balanced views and constructive thoughts are all the more to be appreciated.

Naturally it is pleasing to us that the President of the Institution should uphold the opinions which we have expressed recently on many matters, and that so many matters which we have discussed week by week are considered vital factors as affecting the welfare of the Gas Industry. On the question of holding companies, for example, Mr. Bennett obviously sees eye to eye with us. "It cannot yet be determined," he observes, "if all the expectations of those connected with this development in the Gas Industry will be fulfilled, or if the fears will be realized of those who believe that the movement is not a wise and healthy one. It can, however, be said with certainty that, unless these holding companies are operated in conformity with the experience and tradition of the Industry and its obligations as a public utility, they cannot attract a full measure of support. Some gas undertakings would benefit by being allied to larger concerns, but the view is held by the vast majority that any control must be of the 'finger-tip' type. For instance, the benefits of the 'big brother' can and will be entirely nullified if local conditions are ignored and if the real pride which provincial towns have in the local gas company is destroyed by the undertaking losing its identity." We have previously emphasized the importance of this aspect of the working of a gas undertaking, and make no apology for quoting Mr. Bennett's remarks at some length. Financial opportunism must not be permitted to undermine the confidence of the present personnel of the Industry in its future, or discourage ambitious and talented youth from entering its ranks.

Another point which we have been at pains to emphasize during recent months—and, we believe, to good effect—is that the Gas Industry is essentially a Products Industry, and that its possibilities as a great national service are untold if it adopts this as a dominant idea. It is therefore gratifying to us to note Mr. Bennett's insistence that more attention should be paid by the Gas Industry to the marketing of cokes suitable for all purposes, and that uniformity in delivery must not be con-

fined to size only but should also take into account its properties as a satisfactory fuel for various applications. In the early part of this year we suggested the desirability of forming a National Coke Association. Mr. Bennett, in recording the great success which has met the work of the London and Counties Coke Association, suggests the constitution of other similar Associations. This plan, to be properly effective, must embody a full measure of co-ordination, and we think that a central co-ordinating body is most desirable to formulate policy. In saying this we realize that coke market conditions vary widely in the different areas throughout the country and that district associations are essential to success. In regard to other products, the President refers to the value of benzole recovery and to the fact that the market for creosote has hardened considerably in recent months. In recent months, too, we have had a good deal to say about both these products of the Gas Industry—and again, we suggest, not without effect.

"Prospect"

EARLY this year, on Feb. 6 to be exact, we gave it as our opinion that delay by gas undertakings in contemplating necessary reconstruction work was more than likely to result in eventual financial loss to the undertakings. In view of the fact that money was cheap, we said: "Never was there a more opportune time for the Gas Industry to spend wisely in bringing its manufacturing, storage, and distribution plant into tip-top condition, and in modernizing its domestic equipment to the standard which the public universally demands, and to benefit from low interest charges on capital expenditure and low maintenance cost of running plant." Under the heading, "Retrospect and Prospect," this subject is discussed by Mr. Bennett in his Address; and on this question also his views coincide with our own. He speaks of the effect on gas sales of the warm weather of last December—how promising increases were in many cases nullified by the warmth of the last four weeks of the year. Against this, however, never before was there such a busy time as 1934 in the sales and distribution departments of gas undertakings. One Company alone fixed 280,000 cookers, which is equal to one for every two minutes of the day and night throughout the whole year. Such activity in the installation of appliances must mean that, with a return to greater prosperity and normal seasons, numbers of undertakings may find themselves in the unenviable position of having insufficient manufacturing and storage plant.

Mr. Bennett observes: "With consumption for 1934 not in excess of that for 1933, it is difficult to expect Boards or Committees to incur large expenditure to cover future requirements. That appears to me to be a very short-sighted policy, and those of us who advise the administrators of undertakings should emphasize that the cost of plant can hardly be lower than it is at present, that money is cheap, and that now is the time to put work in hand and thus safeguard the future. With the return to national prosperity, money must become dearer and, if our extensions are to be put off until then, a higher price must be paid, with the result that, however much we may desire to sell gas at a low price, we shall not be able to do so as easily as will be the case if we embark upon capital expenditure now."

There is one other matter to which we would call attention in connection with the Presidential Address, and that is Mr. Bennett's reference to the British Gas Federation, which, he is sure, will consolidate the position and increase the prestige of the Gas Industry. "Many," he remarks, "feel a little restive and critical because the Federation does not appear to have been very active. Let me assure them that it is at work. . . . I have no fear as to the ultimate success and power of the British Gas Federation."

And for our part, we have no fear for the future prosperity of the Gas Industry if the lessons to be learned from Mr. Valon Bennett's Address are taken to heart.

Birthday Honours

Alderman WILLIAM GURNEY BENHAM, J.P., High Steward of Colchester, receives a Knighthood, "for political and public services in Essex." Among manifold activities and interests, the Gas Industry claims much of Mr. Gurney Benham's attention. He has been a Director of the Colchester Gas Company for 37 years, and Chairman since 1918.

* * *

Sir HENRY BIRCHENOUGH, Bt., K.C.M.G., a Director of the Imperial Continental Gas Association, receives the G.C.M.G.

* * *

Dr. STANDEN LEONARD PEARCE, C.B.E., Engineer-in-Chief to the London Power Company, Ltd., becomes a Knight.

* * *

Dr. FRANK STURDY SINNATT, M.B.E., F.I.C., Director of Fuel Research, Department of Scientific and Industrial Research, becomes a Companion of the Bath (Civil Division).

Forthcoming Engagements

June.

11.—I.G.E.—Gas Education Executive Committee, 4 p.m.

12.—COKE SALESMEN'S CIRCLE. — Meeting at 28, Grosvenor Gardens, S.W. 1, 2.30 p.m.

14.—SOUTHERN ASSOCIATION (WESTERN DISTRICT).—Commercial Meeting, Rougemont Hotel, Exeter, 2.30 p.m.

19.—ASSOCIATION OF STATUTORY INSPECTORS OF GAS METERS.—Annual General Meeting, County Hall, Westminster, 10.15 a.m.

19.—B.C.G.A.—Meeting of Executive Committee, 11 a.m.

20.—I.G.E.—Refractory Materials Joint Committee, Stoke-on-Trent, 2.30 p.m.

20.—S.B.G.I.—Council Meeting, 56, Victoria Street, S.W. 1, at 11 a.m.

21.—NORTH OF ENGLAND (AUXILIARY) ASSOCIATION.—Half-Yearly Meeting at Newcastle-upon-Tyne. Address by Mr. S. A. Wikner.

22.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Summer Visit to Winchester.

25.—SOUTHERN ASSOCIATION.—Visit to Guildford.

26.—I.G.E.—Oral Examinations in Gas Engineering and Gas Supply, Board of Examiners, 9.30 a.m.

28.—WAVERLEY ASSOCIATION.—Annual Meeting in Edinburgh.

July.

5.—MANCHESTER DISTRICT ASSOCIATION.—Meeting at Cleckheaton.

5.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—County Meeting at Brighton.

6.—WESTERN JUNIOR GAS ASSOCIATION.—Summer Meeting at Weymouth.

9.—N.G.C.—Meeting of the Central Executive Board.

1935 "JOURNAL" DIRECTORY

Page 2. ABERGAVENNY. A. D. Howells appointed E. & M. vice A. T. Kyle, retired.

Page 6. BERWICK. I. M. Hardacre appointed S. vice J. M. Edney, resigned.

Page 14. BURTON-ON-TRENT. H. Wynne appointed E. & M. vice W. Wilson, resigned.

Page 30. HAVERFORDWEST. D. L. Copp appointed E., M., & S., vice K. E. Tiddy, resigned.

Page 48. NEWCASTLE-UNDER-LYME. C. Loveridge, E., M., & S., retired.

Page 100. BROKEN HILL. R. I. A. Richards appointed G. M. vice T. H. Barson, retired.

Page 103. PORTLAND. J. W. Batchelor, resigned.

PERSONAL

The New S.B.G.I. Chairman.

Mr. D. M. Henshaw, who was elected Chairman of the Council of the Society of British Gas Industries at the Annual Meeting on May 15, received his education at the Merchant Venturers School and Merchant Venturers Technical College, Bristol (later the Faculty of Engineering of

Bristol University). He joined the all-gas firm of W. C. Holmes & Co., Ltd., Huddersfield—members of the Society since 1909—in 1903, and has been a Director since 1920, specializing in improvements in design and construction of condensing and washing plant, gas dehydration, &c. Mr. Henshaw is a Member of The Institution of Gas Engineers.

* * *

Hornsey Presentation to Mr. A. M. Paddon.

An interesting ceremony took place at Hornsey on Thursday, May 23, when, at the Annual General Meeting of Co-partners, Mr. A. M. Paddon, Chairman of the Hornsey Gas Company, was presented with a handsome pair of silver candlesticks of Georgian design from the staff and employees.

The presentation was made by Mr. J. W. Buckley, a Director of the Company and Deputy-Chairman of the Co-partnership Committee, Mr. K. L. Mortimore, General Manager and Secretary, and Mr. C. Gandon, Engineer, being present. He spoke of the great services rendered by Mr. Paddon in initiating the Co-partnership and Contributory Pensions Scheme and of the great interest taken by him in the welfare of the Company's employees and their families. He (Mr. Buckley) had the greatest possible pleasure in making the presentation at the desire of the employees, and on their behalf he hoped that Mr. Paddon would long be spared to preside over the affairs of the Company.

In reply, Mr. Paddon said he sincerely thanked them for the kindly thought that had prompted such a beautiful gift. He had always done what he could for the employees, and while in the past he had derived the greatest satisfaction from being able to give his services in their interest, now that the tables had been turned on him, he found equal pleasure in the rôle of recipient.

He knew from his own actual experience the improvements which had taken place in the conditions of employment in the Gas Industry generally as compared with those which existed many years ago, and it was a great satisfaction to him to know that his part in bringing about these improved conditions had been appreciated.

* * *

Mr. NORMAN MCLEOD was recently presented with a handsome standard lamp by the Directors, Manager, and staff of the Armadale Gas Company, Ltd., to mark their appreciation of his ten years' service as Secretary of the Company. Mr. WILLIAM MCKINLAY, Manager and Accountant, has now resumed the duties of Secretary in succession to Mr. McLeod, who has left Armadale and gone to Wishaw.

Women's Gas Council

At a meeting held in London on May 21, it was unanimously decided to found a Women's Gas Council. The objects of the Council are detailed in the Constitution and Rules which were submitted to the meeting and approved.

It was announced that the Marchioness of Londonderry had kindly consented to become President of the new Association.

The following Executive Committee was nominated to carry out the Executive work of the Association:

British Commercial Gas Association.—Mrs. Eileen Murphy.

Society of British Gas Industries.—Miss Helen Crawford-Fox, Parkinson Stove Company, Ltd.; Miss E. Kirkby, Radiation Limited.

Southern District.—Miss E. Willans and Miss M. E. Thomson, Gas Light and Coke Company; Mrs. A. L'Epine Smith, South Metropolitan Gas Company; Miss Webster, Wandsworth and District Gas Company; and Mrs. E. Iredale, Brighton, Hove, and Worthing Gas Company.

Manchester District.—Miss M. M. Robinson, City of Manchester Gas Department.

Midland District.—Miss O. Humphries, City of Birmingham Gas Department.

Northern District.—Miss F. Wood, Newcastle-on-Tyne and Gateshead Gas Company.

South-Western District.—Miss Thomas, Exeter Gaslight and Coke Company.

South Wales District.—Miss A. M. Mathias, Cardiff Gas Light and Coke Company.

Yorkshire District.—Mrs. O. Roberts, Harrogate Gas Company.

Ireland.—Miss Crawford, Belfast Corporation Gas Department.

Miss Kathleen M. Halpin was appointed Organizing Secretary.

A general discussion took place regarding the work of the Council, and it was agreed that the first matters to be considered were:

(1) The formation of branches in all parts of the country.

(2) The affiliation of the Council to other Women's organizations.

The temporary address of the Council is:

19/20, Grosvenor Place,
London, S.W. 1.

News in Brief

Cookery Demonstrations are taking place daily at the Hulme Town Hall under the auspices of the Manchester Gas Department.

National Gas Council.—We are informed that there will be no Central Executive Board Meeting of the National Gas Council this month.

Having Considered the Proposal of installing both gas and electricity in 63 municipal houses which are being erected in Hollins Grove Street, Darwen Corporation have decided to provide gas only.

Gas Appliances Sold from the Blackburn Corporation showrooms during the past year realized £23,877, an average of £480 per week as against £360 per week the previous year, representing over 7,000 appliances fixed.

The County Meeting of the Eastern District of the Southern Association of Gas Engineers and Managers will be held at Brighton on Friday, July 5, 1935, when a Paper entitled "Gas in the Home" will be delivered.

Fifty Corporation Houses at Manchester will be fitted with coke-burning instead of ordinary coal-burning grates for an experimental period of twelve months if recommendations put before the Council are approved.

A New Gasholder with a capacity of 180,000 cu.ft. has been completed at the Spittal Works of the Berwick and Tweedmouth Gaslight Company. The Contractors for the work were Messrs. R. & J. Dempster, Ltd., of Manchester.

That Application be made to the Ministry of Health for sanction to borrow the sum of £10,000 in respect of the purchase of "simple hire" gas cookers is proposed by the Birkenhead Gas Committee. The loan is to be repaid in ten years.

Application for a Special Order under the Gas Undertakings Acts, 1920-1934, is intended to be made to the Board of Trade by the Oswestry Gas Light and Coke Company, Ltd., the objects of which include the extension of limits of supply.

Application is to be Made by the Sheffield Gas Company to the Board of Trade for a Special Order under the Gas Undertaking Acts, 1920 to 1934, with the objects *inter alia* of sanctioning and confirming the purchase of the undertaking of the Baslow Gas Light and Coke Company, Ltd.

The Price of Gas has been reduced in Arbroath by 2d. per 1,000 cu.ft. The Gas Committee have agreed to recommend to the Town Council that the price of gas for ordinary consumers be reduced from 2s. 6d. per 1,000 cu.ft. to 2s. 4d., and, in the case of prepayment consumers, from 2s. 10d. to 2s. 8d.

An Increase of 7·82% in the Gas Made for the year ended May 15 is reported by Mr. Peter Low, Engineer and Manager of the City and Royal Burgh of Elgin Gas Department, who told the Town Council that the output during the year amounted to 112,568,900 cu.ft., or 8,165,300 cu.ft. more than last year.

Plans were Passed at Alloa Dean of Guild Court for a handsome two-storey building which is to extend from Bank Street into Coalgate. The block will contain accommodation for the Corporation Gas Undertaking, including showroom, demonstration room, general service workshop and stores, and shops.

Even Better Results than were Anticipated have been obtained, the Engineer, Mr. A. T. Harris, informs us, from the new Drakes vertical retorts at the Great Wigston Gas Company which have now been working for a month. The retorts are six in number, set in one line, and are fitted with a waste-heat boiler and a coke-screening plant.

A Successful Exhibition of gas appliances promoted by the Castleford and Whitwood Gaslight and Coke Company concluded on Friday, May 31, with a dinner, to which builders, architects, plumbers, and others were invited, and a Paper was given by Mr. T. Shadbolt, of the Leeds City Gas Department, on "The Domestic Use of Gas in the Modern Home."

United Kingdom Gas Corporation, Ltd., and Birkenhead.—We learn from a local correspondent that Birkenhead Gas Committee has received a letter from Messrs. Close Bros., Ltd., of London, enquiring if the Corporation would be prepared to consider a proposal from the United Kingdom Gas Corporation, Ltd., for the acquisition of the Gas Undertaking. The Committee recommend that Messrs. Close Bros., Ltd., be informed that the Corporation are not prepared to sell the Undertaking.

The Issue of £50,000 6% preference stock in the Bournemouth Gas and Water Company produced applications amounting to £132,000. As indicated in the prospectus, preference in allotment has been given to consumers and employees of the Company, and special consideration has also been given to small applications. Allotment letters were posted on Tuesday, May 28.

A Successful Demonstration Week was held recently at the temporary showroom, 32, Union Street, Dowlais, by the Dowlais Gas and Coke Company, which attracted large attendances at both afternoon and evening lectures. Menus were prepared by Mrs. P. Bacon, of the Radiation Research Kitchen, and various dishes were cooked in a "New World" "Regulo"-controlled gas cooker. A cake-baking competition also proved very popular, prizes for which were presented by the Manager's wife, Mrs. J. H. Jones.

We are Informed by Messrs. William Coward & Co., Ltd., 3, St. James' Square, S.W. 1, that they have been appointed the London agents to the North Shore Gas Company, Ltd., of North Sydney, New South Wales. It will be recalled that the Secretary of the North Shore Gas Company, Mr. S. J. Janes, who is taking a prominent part in developing the use of gas in New South Wales, visited this country during the summer and autumn of last year and made an extensive study of the Gas Industry's activities in Great Britain.

One of the Most Attractive Stands at the recent Irish Industries Fair section of the Royal Dublin Society's show at Dublin attended by close on 100,000 visitors was that of the Alliance and Dublin Consumers' Gas Company, where every recent improvement for increased efficiency devised in the Industry was exhibited and explained. The demonstration and sales staff were kept busy during the run of the exhibition and many orders were booked. The Gas Company have equipped an all-gas house at a building site near the city.

A New Gas Main is to be laid to Portobello at an estimated cost of £24,000 by the Edinburgh Gas Department. The recommendation for the work came before the Public Utilities Committee on June 1 and was approved. Mr. J. Jamieson, Engineer and Manager of the Gas Department, reported that for the past two or three winters difficulty had been found in maintaining the supply of gas to Portobello, which was at present carried through a 15-in. main which was laid in 1897. In view of the large Niddrie Mains housing scheme, it had become essential to make provision to augment the supply to that area.

Gas-Making Coals Imported into the Irish Free State during the month of March, according to the return just issued, fell to £19,716, against £21,309 for the corresponding period of last year, making for the quarter £55,571, against £69,963. Cast-iron gas pipes and fittings imported during the month totalled £2,438, making for the first quarter of the year £7,860, as compared with £4,160 last year. Imports of gas heaters, cookers, and parts increased from £3,501 to £5,711, making for the quarter £11,694, against £10,666. Other gas appliances imported during the month totalled £3,373, making £4,490 for the quarter.

The New Workshops of the Perth Corporation Gas Department received official inauguration on May 29 in the presence of members of the Town Council, officials, and representatives of the business community. Costing over £5,000 to erect, the commodious new building completes the centralization of the Gas Department Works at Friarton and includes stores, workshop, and apparatus for the overhauling and reconditioning of appliances. Ex-Bailie Gowans, Gas Convener, who was subsequently presented with a silver tea set from the contractors as a souvenir of the occasion, said the cost of the new buildings would certainly be returned to the consumers in better service.

Atmospheric Pollution.—36 representatives of local authorities and other organizations co-operating with the Department of Scientific and Industrial Research, including the B.C.G.A., in the investigation of atmospheric pollution met on May 27 in the half-yearly conference at the Offices of the Department. The Conference, over which Councillor W. Brownhill Smith, M.V.O., presided, received a report from Dr. G. M. B. Dobson, F.R.S., on the progress of the researches carried out under the Atmospheric Pollution Research Committee. Dr. Dobson informed the Conference that a full-time investigator had been appointed by the Department as a preliminary to the undertaking of an intensive survey at a selected centre.

An Exhibition of Gas Appliances, together with cookery demonstrations, was recently held for a fortnight by the Minehead Gas-Light and Coke Company. The firms participating in the Exhibition were Richmonds Gas Stove Company, Ltd., and John Wright & Co., Ltd., of Radiation, Ltd., R. & A. Main, Ltd., who displayed cookers, fires and general appliances, W. H. Dean & Son, Ltd., who demonstrated their range of washing machines and wash-coppers, and Ascot Gas Water Heaters, Ltd., who displayed a full range of their water heating appliances. Good attendances resulted, and a satisfactory amount of business was done, the sales of gas apparatus amounting to just under the gross figure of £600.

The New Coastal Tanker of the National Benzole Company, the m.v. "Ben Olliver," built as the result of the growing demand for motor spirit produced from British coal, was launched at Rowhedge Ironworks, Colchester, on Tuesday, May 21. The ceremony was performed by Mrs. J. H. Olliver, wife of Mr. J. H. Olliver, Director of the National Benzole Company, after whom the ship was named. The vessel, which has a carrying capacity of 135 tons, will be one of the most up-to-date ships on the coastal service, the quarters of the officers and crew being equipped with baths, wash-bays, running hot and cold water in the sleeping compartments, and hot water radiators. The vessel is of British manufacture throughout, the steel used being supplied by steelmakers who are members of the National Benzole Company.

The Sixth International Congress for Scientific Management is to be opened by its Patron, H.R.H. the Prince of Wales, in the Central Hall, Westminster, on July 15. The Chairman and Committee are grateful for the magnificent support which has been given them in particular by H.M. Government and the Federation of British Industries. For four days a series of conferences will provide a channel for expert discussion on the problems of practical management in relation to industrial, commercial, agricultural, and domestic matters. Parallel with these technical conferences a very comprehensive hospitality programme has been arranged. To conclude the Congress visits of factory inspection covering representative types are available to members. The Papers for discussion at the Congress amounting to two hundred in all are now available.

Through the Enterprise mainly of the Alliance and Dublin Consumers' Gas Company a new Irish-produced motor spirit is now available for motorists in the Irish Free State. It is known as "Irishell," a blend of benzole and high-class petroleum spirit, and its production has been made possible by an agreement between the Gas Company and Irish Shell, Ltd. At very considerable expense the Gas Company recently completed an installation at their Dublin Works for the manufacture of the benzole which is blended with high-grade petroleum spirit produced by Irish Shell, Ltd. The plant laid down by the Gas Company comprises the most modern equipment for the manufacture of the spirit up to the highest international standard. Already "Irishell" had developed a big market, and it is claimed that this is the beginning of a big, important new industry.

Amalgamation and Grouping

Caledonian Gas Corporation and Stane and Dykehead.

We learn from a local correspondent that the shareholders of the Stane and Dykehead Gas Company, Ltd., have sold out their holdings to the Caledonian Gas Corporation, Edinburgh, who have now taken over the Undertaking.

New Carbonizing Plant for Birmingham

Nine Millions per Diem "W-D" Installation.

The City of Birmingham Gas Department have placed with the Woodall-Duckham Company an order for a new installation of continuous vertical retorts, with a net daily gas-making capacity of over 9 million cu.ft.

The new plant, which is to be installed at the Windsor Street Works, will comprise two benches, each of twenty-eight 103-in. upwardly-heated retorts (56 retorts in all). These will be capable of carbonizing a gross total of 590 tons of coal a day, and each bench will be heated by means of an independent battery of seven producers. Three waste-heat boilers will be provided, each capable of dealing with the waste gases from a complete bench of 28 retorts.

The new plant will be erected in the existing retort house on the site of one of the original ranges, which comprised 44 retorts having a nominal throughput of 220 tons per day. The plant to be replaced has been in operation for over 22 years and during its working life has carbonized over 1,100,000 tons.

Yorkshire Junior Gas Association

On May 18, Mr. C. A. Newham, of Leeds, contributed a Paper, "Some Incidents and Sequels in Gas Manufacture," to the Yorkshire Junior Gas Association. The meeting was held at the Assembly Rooms, Wakefield, by kind arrangement of the Directors of the Wakefield Gaslight Company and Mr. C. W. Ward (General Manager), who were subsequently hosts to the gathering at tea. This was the final meeting of the current session of the Association. Mr. Ralph Halkett, Junr. (Sheffield), the President of the Association, presided over a large gathering.

Mr. C. W. WARD, in offering a welcome to the visitors, remarked that the Paper they were to hear, dealing with the manufacturing side of gas, was on a subject the importance of which should never be forgotten even in these days when a great deal of special attention had to be paid to the selling side. It might be that the old adage of the Industry, that profits were made in the retort house, had been somewhat modified by modern recognition of the importance also of the selling side and widespread attention to improving the efficiency of appliances, but there must be no diminution of adequate attention to manufacturing the product they had to sell.

On the motion of Mr. J. W. CARLTON (Shipley), seconded by Mr. A. W. ELLIOTT (Elland), hearty thanks were awarded Mr. Ward and the Directors of the Wakefield Gaslight Company for their facilities for the meeting and their hospitality.

[Mr. Newham's Paper and a report of the discussion will be found on later pages.]

Gaining Business at Coatbridge

Two-Part Tariff and a 4,000 B.Th.U. Unit

In a Paper before the Scottish Branch of the Smoke Abatement Society at Stirling on May 24, Mr. George Braidwood, of Coatbridge, explained that at the beginning of this year the Coatbridge Gas Company made several interesting alterations in its gas supply service, with the intention of affording a supply of gas of a quality and at a price calculated to benefit both the domestic consumer and the cause of smoke abatement. Those in charge of the administration of the Company, alive to the fact that gas sold on a flat rate basis could not hope to compete with raw coal in the domestic grate, decided on the introduction of a "Domestic Two-Part Tariff," to operate under the Special Contract clause of the new Act of 1934.

This promotional tariff consists of a reasonable charge for the service afforded *plus* a commodity rate for the gas of 3d. per therm. By this method the consumer is required in the first instance to pay his fair proportion of the charges involved in providing the domestic supply service, after which all gas supplied is at the rate of 3d. per therm. This rate of 3d. is one truly competitive with good domestic coal, when the efficiencies in use of the respective fuels are kept in mind.

With the introduction of the "Two-Part Tariff," continued Mr. Braidwood, a more convenient unit than the legal therm of 100,000 B.Th.U. was introduced by the Company. This unit of 4,000 B.Th.U. gross is a 25th part of the therm, and is approximately equal to the 3,412 B.Th.U. net of a B.o.T. unit of electricity. Thus proper comparisons may be made of the relative merits of different methods of heating, and incidentally it shows that Coatbridge gas may be bought for the very low price of 0·12d. per unit for domestic purposes.

Alive to the merits of luminous flame gas in the "diffusion flame system" of combustion in industry, as well as the important "time factor" both in industrial and domestic use, the Company decided to supply gas of the highest possible quality consistent with the type of carbonizing plant in use. The quality decided on was 500 B.Th.U. per cu.ft. gross. This quality has been found to meet local circumstances admirably, particularly those connected with distribution. Evidence of this is proved at Cumbernauld, where some 10 miles from the gas-works an excellent supply is afforded by means of a low-pressure main

Certain advantages are also found in condensing, purifying, and storage of the smaller volume of gas to be handled compared with a lower quality gas. Another advantage obtained is that the solid smokeless fuel resulting from its manufacture is of a better quality, probably due to less steaming of the charge, than that obtained from the manufacture of gas of lower quality.

It will be seen from these explanations that with the introduction of modern legislation the Gas Industry is now in a position to depart from the flat rate method of charging and to adopt tariffs and sell gas at prices calculated to

ensure final efficiency in the continuous heating of the homes of the people.

In the industrial field, should the surplus coke oven gas, which will be available on the erection and working of the new coke ovens at the blast furnace works, be distributed in a manner similar to that suggested for Lanarkshire and Renfrewshire, and at prices which will help forward final efficiencies in the different manufacturing processes, the Smoke Abatement Society will be armed with an argument against the continuance of the industrial smoke nuisance, to which the leaders of industry will have difficulty in replying.

Cake-Baking at Whitstable

Our photograph shows some of the many entries in the cake-baking competition at the Radiation Cookery Demonstrations and Exhibition of Gas Appliances held in the Masonic Hall, Whitstable, from May 13 to 17.

Gas Cookery Demonstrations at Ammanford

A successful exhibition and series of gas cookery lectures were recently held over a period of a fortnight by the Ammanford Gas Company in conjunction with the Parkinson Stove Company, Ltd., and Messrs. Falk Stadelmann & Co. For the first week the Drill Hall was used and the opening ceremony was performed by Councillor Parry-Jones, Chairman of the Carmarthen County Council. The cookery lectures given by Miss G. L. Hughes, Diplomee Melbourne (Emily MacPherson) College of Domestic Economy, of the Parkinson Stove Company Research Kitchen, attracted very satisfactory attendances each day, and the total number for the week was close on 1,000.

The demonstrations during the second week were held at Garnant in the Haig Memorial Hall, and again good attendances were recorded.

Keen interest was shown by housewives, in the display of modern gas appliances, and Mr. F. Thomas, the new Manager of the Gas Company, was able to record satisfactory results from his first exhibition at Ammanford.

Hotel, Restaurant, and Catering Exhibition

Olympia, Nov. 29 to Dec. 6.

The Gas Industry will have an unparalleled opportunity to show what it is doing for the hotel and catering industry when the Hotel, Restaurant, and Catering Exhibition is held in the National Hall, Olympia, from Nov. 29 to Dec. 6.

We are informed by the promoters, Trade and Technical Exhibitions, Ltd., Drury House, Russell Street, W.C. 2, that the exhibition will be held under the auspices of the Hotels and Restaurants Association, the Residential Hotels Association, and the Réunion des Gastronomes. Such an exhibition has long been called for by the trade itself and, now that conditions in this country are steadily improving, a demonstration of the many improvements of recent times in catering equipment must prove of especial value to the many proprietors and managers who have of necessity delayed expenditure until the right moment for bringing their establishments up-to-date. The exhibition will come in the quiet time between the close of the busy holiday season and the short Christmas rush of business. This will permit of sufficient leisure for the proprietors to plan ahead.

A Golden Jubilee

Heartiest congratulations to Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Parkfield Works, Stockton-on-Tees, on the attainment of their Golden Jubilee. It was fifty years ago that the Company, well known to gas engineers and others in all parts of the world as designers and constructors of complete plant and equipment for gas, chemical, and iron and steel works, was incorporated in its present form.

We learn that the occasion is to be duly celebrated by an excursion to Scarborough and luncheon on Whit Tuesday.

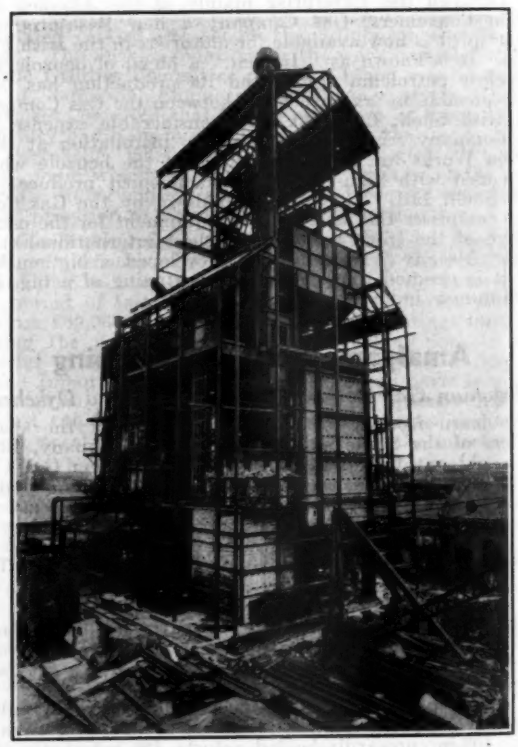
Recent Orders for Glover-West Plant

Steady Progress Maintained

In addition to orders at present in hand, we are informed, West's Gas Improvement Company have recently entered into several important new contracts for installations of Glover-West vertical retorts.

A complete plant ordered by the Buxton Corporation Gas Department will comprise eight retorts of the 50-in. steaming type with a daily capacity of 750,000 cu.ft. of gas. From Scotland there are orders for a complete installation at the works of the Kilsyth Corporation Gas Department of four 50-in. steaming retorts with a capacity of 400,000 cu.ft. per day, and an extension of four 33-in. retorts which will increase the nominal capacity of the plant built for the Montrose Gas Company in 1921 to 560,000 cu.ft. per day. The Slough Gas and Coke Company have ordered a unit of twelve 50-in. steaming retorts with a capacity of just over a million cu.ft. per day. In Denmark the number of West-built carbonizing plants will be increased by an installation of eight 40-in. Glover-West steaming retorts rated at 520,000 cu.ft. daily capacity, ordered by the Svendborg Municipality.

Constructional work is going forward on Glover-West vertical retort plants for the Buckhaven and Leven Gas Commissioners (an extension to the plant built in 1926); the Fal-



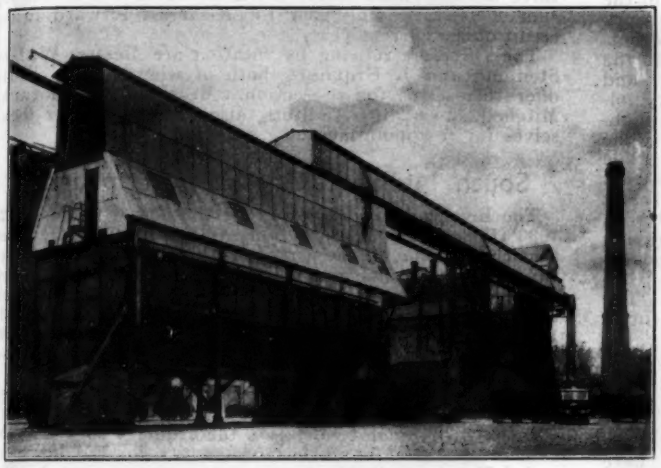
An installation of Glover-West vertical retorts in course of construction at Stratford-on-Avon.

kirk Corporation Gas Department (extension to plant built in 1921), the Johannesburg Municipality (a complete duplicate of the plant installed when the new Cottesloe Gas-Works was constructed in 1928, arranged as an extension); the Manchester Corporation Gas Department (an extension to existing plant at the Department's Rochdale Road Works); the Stratford-on-Avon Corporation Gas

Department (a plant of eight 50-in. retorts with a daily capacity of 750,000 cu.ft.); the gas undertaking of Reus, Spain (five 40-in. retorts); and the Consumers' Gas Company of Santiago, Chile (the third installation for this undertaking). Progress is being made in the Drawing Office and Works with the important installation for the Southend-on-Sea Works of the Gas Light and Coke Company. There is good progress also with "Westvertical" carbonizing chamber plants. Work is in hand on contracts for the Watford and St. Albans Gas Company, the Willenhall Gas Company, and the North Shore Gas Company of Sydney, Australia.

Glover-West plants have been put into commission in recent months at Bilston, Clevedon, Leicester, Llanelly, Roskilde (Denmark), and Yeadon.

New orders for fuel-handling and treatment plants now being handled by West's include a coal plant for the Howdon Works of the Newcastle-upon-Tyne and Gateshead Gas Company and a coke plant for the Stretford and District Gas Board.



A View of the Leicester Gas Department's Belgrave Gate Works with the Reconstructed Glover-West Plant in the background and the Coke Plant nearer the camera.

New Glover-West Verticals at Leicester

The accompanying article is extracted from a contribution to *West's Gas* for May, 1935, by Mr. J. Mitchell, Engineer and Manager of the Leicester Corporation Gas Department

The original Leicester Gas Company was formed in 1821, and Leicester was first lighted by gas in October, 1822. The first works were established adjacent to the canal in Belgrave Gate, and these supplied the whole of the gas for Leicester until 1879, when new works, together with a modern chemical works, were constructed on the Aylestone Road.

In 1878 the Undertaking was taken over by the Corporation and the plant at both works has been added to from time to time. Until 1914 the whole of the coal gas was made in horizontal retorts, but in that year ten settings of Glover-West vertical retorts were installed at Belgrave Gas-Works, these being extended to 14 settings in 1921. Later the whole of the horizontal retorts at the Aylestone Road Works was superseded by two installations, in 1921 and 1923, of Glover-West vertical retorts, and added to in 1926 by a complete new works of five million cu.ft. capacity, including eight settings of Glover-West retorts, washing and purifying plant, and a spirally-guided gas holder of similar capacity.

Glover-West Plant Installed at Leicester Gas-Works.

Belgrave Gate Works—			
1914	10 settings,	2,500,000 cu.ft.	per diem*
1921	4 ,,	1,200,000 ,,	,,
1934	5 ,,	2,500,000 ,,	,,
Aylestone Road Works—			
1921	8 settings,	2,250,000 ,,	,,
1923	7 ,,	3,500,000 ,,	,,
1926	8 ,,	5,000,000 ,,	,,

* Five settings dismantled in 1934.

This article is a short account of the recent reconstruction and replacement of five of the old 1914 settings at Belgrave Gas-Works by modern settings.

Early in 1934 the Leicester Gas Committee in their efforts to find further fields for the use of gas decided that if they could offer gas at 1s. 6d. per 1,000 cu.ft., there were excellent prospects of securing additional loads for central heating by gas, and for the displacement of solid fuel and oil for such purposes as bread baking and the like. It was apparent that the Department must have the most up-to-date and efficient gas-making plant if this scheme was to be successful, and whereas all the retorts at Aylestone Road Works were of recent construction there were still ten of the old fireclay retorts at Belgrave Gate Works. These were in need of very extensive repair, which meant that they would have to be practically rebuilt throughout, and as each setting was barely capable of producing 300,000 cu.ft. per diem with steaming, it was decided to replace them with modern settings.

The dismantling of the five old settings presented one or two difficulties. The old foundations which were laid down in 1914 consisted of a solid raft of concrete some 8 ft. in thickness, and this had to be partly broken up to allow for the new coke-handling rubber band conveyor which was to run under the floor of the new retorts.

The other difficulty was due to the fact that while the construction of the new retorts was being carried out, six of the remaining settings were gas making, and arrangements had to be made for the coal conveyor to be available for these retorts. The difficulty became more acute when the new coal hoppers were being placed in position above the retorts, as it will be readily understood that the conveyor itself had to be raised.

To take the place of this conveyor while it was being raised, Messrs. West's Gas Improvement Company installed an auxiliary steel band conveyor which was fed by the new 100-ton lip bucket conveyor, of the latest design with automatic lubrication, which in the completed scheme connects the rubber band coke conveyor under the settings to the belt conveyor running on the top of the old telpher track to the coke graders.

The new installation consists of five settings of 33 in. Glover-West vertical retorts with steaming chambers, capable of producing 2½ million cu.ft. of 450 B.Th.U. gas, which is only 500,000 cu.ft. less than the capacity of the whole of the ten old settings. The producers are of the latest design for breeze burning worked on the blower system, the steam being controlled by West-Taylor valves. The retorts are built of Peaksil silica sections, these having proved the most successful in the Aylestone Road Works. The gas pressure from the five settings is controlled by an Arca regulator. A waste-heat boiler is incorporated in the installation with a capacity of 8,000 lbs. of steam per hour from and at 212° F. The fan is driven by a Sissons vertical steam engine of 25 H.P.

The coke grading plant is of the latest West oscillating type, and is housed over the existing coke hoppers and fed either from the old telpher or by the new band conveyor as previously mentioned. Provision has also been made for storing coke by means of a chute from the cross-band conveyor to the coke yard.

The results obtained with the new plant from Jan. 1, 1935, are as follows:

Coal carbonized	13,022 tons
Gas made	259,615,000 cu.ft.
Make per ton	19.937 cu.ft.
Calorific value	451·5 B.Th.U.
Therms per ton	90·02

Southern District (Kent Area) Salesmen's Circle

Visit to William Sugg's Westminster Works

At the invitation of Messrs. William Sugg & Co., Ltd., 32 members of the Southern District (Kent Area) Gas Salesmen's Circle paid a visit to the Westminster Works on Wednesday, May 15.

The party, accompanied by the Chairman of the Circle, Mr. G. R. Kennett, were received by Mr. Philip H. Sugg, Chairman and Managing Director. The members then proceeded under the direction of Mr. T. Mattock, Superintendent of Works, and with the assistance of some of the staff on a tour of the Works. They were shown the work produced in the spinning shop, which deals with the outside casings of lamps, reflectors, &c., and passed on to the blacksmiths' shop where swan necks, columns, and wrought-iron frogs are made. A visit to the foundry followed and thence the party proceeded to view the high-speed automatic lathes on which are produced not only the brass work to complete the lamps, but also a considerable variety of fittings which are being supplied under contract to various gas companies, a visit to the gauging department in connection with these products proving of great interest.

Other departments visited included the pattern making shop, engineering department, plating department, polishing shops, glass stores, and tin shop, which deals with square lanterns of the "Windsor" and other types. The tour was completed by an inspection of the department in which are assembled the various parts comprising the "Rochester," "Littleton," and other types of lamps, particular interest being shown in the assembly of the firm's latest production—viz., the "London" lamp.

On their return to Ranelagh Works an opportunity was afforded of inspecting the Photometrical Research Department. After inspecting the Works, the members were entertained at tea, at which they were joined by Mr. W. Mattock, Joint Managing Director.

Mr. Kennett having dealt with certain business appertaining to the Circle, then requested Mr. Philip Sugg to address the meeting.

Mr. Sugg extended a hearty welcome to the Circle on behalf of the Board of Directors and gave a few details regarding the history of the firm. He drew attention to a Deed of Co-partnership dated 1838, which the members had an opportunity of examining, dealing with the business established by his grandfather in Marsham Street. The number of employees was then approximately 30, whereas at present the firm gives employment to some 900 workers. In 1861 it became necessary to acquire larger premises in Vincent Street which forms one side of the site on which the present Vincent Works has been developed. The advent of the war and the manufacture of munitions necessitated the acquirement of Ranelagh Works, Chapter Street, Westminster, and, owing to further post-war developments, an additional works at Edmonton.

Mr. Sugg stressed the present necessity for the provision of accurate technical data in connection with public lighting installations, and said that he felt sure that the members would have been very interested in the Photometrical Research Department.

In once again expressing his pleasure in having had the opportunity of entertaining the members of the Circle, Mr. Sugg mentioned the fact that his eldest son, Mr. P. Crawford Sugg, who had recently joined the staff and had been responsible for designing the whole of the equipment in the Photometrical Laboratory, was present. Therefore, with the portraits of Mr. Sugg's grandfather and father on the wall, to which he directed the attention of the members, four generations were represented, a fact for which he felt sure he could rely on their congratulations.

Mr. W. Mattock, on behalf of the firm, expressed his pleasure of having had the opportunity of assisting in entertaining members of the Circle. He hoped that they had enjoyed their visit to the Works and that each member of the Circle would have seen something which would mark in their memory for all time the occasion of this visit.

Mr. Kennett, Chairman of the Circle, in proposing a vote of thanks, said that it was with very great pleasure that he had to record a very hearty vote of thanks to Mr. Philip H. Sugg for his very kind hospitality that day. He said that so far as the retention of public lighting was concerned, they owed much to Messrs. William Sugg & Co., Ltd.

He thanked Mr. Philip Sugg particularly for his very humorous and interesting Address and added that he thought it was a very nice "wind-up" to a very pleasant afternoon.

Gas Corporations' Results

Associated Gas and Water Undertakings, Ltd.

The accounts of the Company for the period ended March 31, 1935, show that after deducting the preference dividend due on Nov. 30 last, and the interim ordinary dividend paid to Dec. 31, 1934, at the rate of 5% per annum, there remains a balance of £2,809 available for distribution.

Of this sum the preference dividend (less tax) for six months, payable on May 31, will absorb £1,570, and the Directors recommend the payment of a dividend at the rate of 5% per annum, less tax, on the ordinary shares for the three months ended March 31, 1935. This will absorb the sum of £872, leaving £367 to be carried forward to the credit of the current year.

The Directors retiring by rotation are Messrs. W. Lees Stenning and J. Urquhart, both of whom being eligible offer themselves for re-election. Messrs. Peat, Marwick, Mitchell, & Co., the Auditors, also retire and offer themselves for re-appointment.

South Midlands Gas Corporation, Ltd.

The Report of the Directors for the period from Dec. 2, 1933 (the date of incorporation), to March 31, 1935, states that the revenue for the period, after providing for income-tax, other expenses and interest on the purchase money for the Eynsham Works, amounts to £2,916, from which there is to be deducted the preference dividend to March 31, 1935, and the interim ordinary dividend paid on Sept. 30 last, which absorb the sum of £1,993, leaving a balance available for distribution of £924.

The Directors recommend that this sum be appropriated in the following manner:

In paying a final dividend on the ordinary shares at the rate of 5½% per annum less income-tax for the half-year ended March 31, 1935, which will absorb the sum of £615, in writing off the whole of the underwriting commission, £188, in reducing the goodwill of the Eynsham Undertaking by the sum of £58, reserve for premium on redemption of preference shares, £18, leaving a balance to be carried forward of £44.

The final dividend on the ordinary shares now recommended, together with the interim dividend already paid, make a total dividend for the period at the rate of 5½% per annum.

The retiring Director is Mr. W. H. Castle, who, being eligible, offers himself for re-election. Messrs. H. N. Murray & Co., the Auditors, also retire and offer themselves for re-appointment.

South-Western Gas and Water Corporation, Ltd.

The accounts of the Corporation for the financial period ended March 31, 1935, show that the revenue amounted to £22,214, and after providing £9,354 for income-tax, debenture stock interest, and expenses, there remains a balance of £12,860, available for distribution. From this balance the Directors have paid the preference dividend for the period ended March 31, 1935, at the rate of 4½%, less income-tax, amounting to £2,749, leaving a balance of £10,111.

The Directors recommend the payment of a dividend on the ordinary shares at the rate of 5% per annum, calculated from the respective dates from which the ordinary shares rank for dividend. At the date of the balance-sheet there were 413,388 ordinary shares issued, but since that date a further 2,519 ordinary shares have been issued ranking for dividend from Jan. 1, 1935, making a total of 415,907 ordinary shares. The dividend on such 415,907 ordinary shares, less income-tax, will absorb £10,090, leaving £20 5s. 1d. to be carried forward.

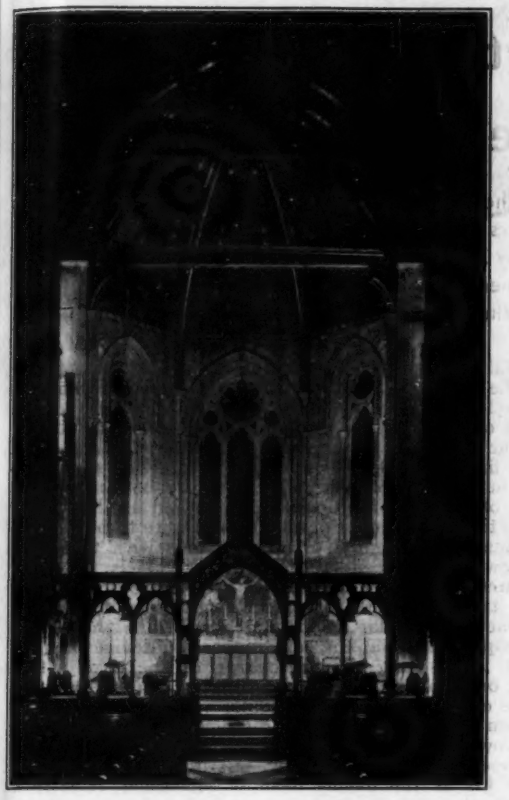
The present period has been one of acquisition, during which the capital issued has been increased as fresh purchases were effected.

The revenue includes dividends accrued before acquisition, but no dividends from the subsidiary companies have been received or brought into the accounts in respect of the three months from Dec. 31, 1934, to March 31, 1935.

The income from investments for the period was £18,788, but a full year's income from the same investments at the same rates of dividend would be £27,341.

Mr. Harold G. Palmer, Mr. J. M. Whittington, and Mr. F. C. St. Aubyn, having been appointed to the Board under the provisions of Article 110, retire, and being eligible offer themselves for re-election.

Messrs. Deloitte, Plender, Griffiths, & Co., the Auditors, also retire and offer themselves for re-appointment.



GAS LIGHTING OF WALTHAMSTOW CHURCH

Effective Installation by the Lea Bridge Company

Our photographs show the excellent gas lighting which has been effected in St. Saviour's Church, Walthamstow, by the Lea Bridge District Gas Company. The lighting of the nave of the church is by simple wrought iron brackets with Sugg's "Exeter" burners, each of three No. 2 mantles, and silica globes. These are operated by Sugg's distance controls, to enable either one, two, or three brackets to be in use at any time. The chancel is illuminated by concealed lighting of Sugg's directive burners, operated by pneumatic distance controls. Several "Newbridge" switches are fitted to cluster burners with silica globes at other positions. The lighting is simple, effective, and unobtrusive, and enhances the architectural beauty of the church.

British Industries House Display

The attractive display illustrated was installed in an Oxford Street window of British Industries House for the Jubilee, and created considerable public interest. The centre piece displayed the cooker which has been chosen for the King's House, and was arranged in a built-up unit of "Staybrite" steel, and made a very dignified centre piece for the window. Two single unit "R.A." cookers were arranged at each side, and the novel features of this new Parkinson gas cooker were displayed on the circular chromium indicators. The whole of the background and floor covering was in dark blue velour, and the window finished with a shaped pelmet of Jubilee Blue velour with chromium relief. The display was designed and arranged under the direction of Mr. Backhouse, the Parkinson Display Manager.

Another Women's Gas Circle Formed

Our photograph shows the new Demonstration Hall opened by the Swindon United Gas Company in connection with their recently formed Women's Gas Circle. Demonstrations are held here twice weekly, after which tea is provided and the various uses of gas are discussed. The hall, which includes examples of all the latest domestic gas appliances, is tastefully decorated in green and cream, with soft furnishings in a shade of beige, and is complete with beechwood tables with marbilized tops. Similar demonstrations are held periodically in the Company's branch showrooms at Wootton Bassett, Highworth, and Faringdon.

Continuous Vertical Retorts for Small Undertakings

by
D. W. DAVIES

In this Paper, which he presented to the Wales and Monmouthshire Association of Gas Engineers and Managers, at their Annual Meeting at Llanelly on May 23, Mr. D. Walter Davies, of Tredegar, gave details obtained from five years' experience of upwardly-heated continuous verticals.

When asked to give this Paper, I hesitated, thinking that our experience at Tredegar could not be of general interest to gas engineers, inasmuch as we are not carbonizing a recognized gas coal, and the conditions under which we work are possibly not applicable to any other works.

I will refresh your memory with a brief history of our works. These cover an area of an acre and a half, and up to 1929 our carbonizing plant consisted of two retort houses, with stage floors, one containing two settings of six, and the other four settings of eight stop-ended retorts, D section, all charged and discharged by hand. The maximum number of stokers employed at that time was 14. The coal used was a local one known as "Troedrhiwgwair Through." An analysis of same gave the following result:

	%
Volatile matter	29·05
Fixed carbon	61·95
Ash	7·75
Moisture	1·25

Using this coal, our last figures, which relate to the year ended March 31, 1928, for carbonizing in horizontal retorts, are as follows:

Gas made	69,806,100 cu.ft.
Coal used	4,888 tons
Yield of gas per ton of coal	14,281 cu.ft.
Coke for sale per ton of coal	9¼ cwt.
Tar produced per ton of coal	8¾ galls.
Quantity of coal charged per man per shift	37 cwt.

In 1928, after thoroughly investigating every kind of plant used for gas making and considering the purchase of coke oven gas, the Council decided to install "Verticals." In my Presidential Address to you in May, 1928, I stated: "I can see some of you smiling at the idea of verticals for a 70,000,000 works using a South Wales Through Coal." Let me now assure you that the installation of verticals has fully justified itself, notwithstanding the difficulties we have experienced with coal, which I will deal with later on in this Paper.

There is possibly no form of high-temperature carbonizing plant which has undergone more striking changes in design in the last ten years than continuous vertical retorts.

It is always difficult to assess the full effects of such changes, because in the striving after improvement in one direction it is very easy for other factors to become upset, and it is only after some years' experience of the actual working of plants that one can safely say that the modifications they embody, in relation to previous practice, are or are not improvements in the all-round sense. It may perhaps be of more than ordinary interest to describe the Woodall-Duckham continuous vertical retort plant erected in 1929 at Tredegar. First, because this was the first plant in Great Britain in which was incorporated the upward heating system, and, secondly, because I feel justified, after five years' operation, in making (with whatever diffidence I may experience in so doing) some judgments as to the success of this departure, which has since become standardized practice on nearly all plants of this type.

The plant at Tredegar comprises six upwardly heated retorts set in double lines and arranged independently for controlled heating and scurfing. They are heated by means of two step-grate producers, placed at the retort house floor level at one side of the bench. The retorts are of the usual rectangular, tapered section, are about 25 ft. high, and have a major axis dimension of 53 in. and a minor axis width of 10 in. at the top and 18 in. at the bottom. The Woodall-Duckham heating system has always comprised a series of vertical flues on each major axis wall of the retort. Each retort has its own producer gas, secondary air, and waste gas dampers, and by these means can be separately controlled. In addition, control is supplied to each vertical flue, which makes it simple to ensure even heating across the full width of the charge. It has always been claimed that the vertical form of flue construction lends the greatest rigidity to the retort structure and thus ensures long life, and, from the constructional point of view, it certainly seems the most natural form to adopt.

On the Tredegar installation, as I have already stated, for the first time in this country the direction of the flow of the heating gases was made from the bottom upwards instead of from the top downwards, as had until then been the practice. A number of advantages were to be expected from this change, but I propose to deal with these later in reviewing the working of the plant. It is, of course, well known that with continuous vertical retorts the rate of coal travel through the retort is governed by the rate of extraction of coke at the bottom. It is therefore of great importance that the coke extraction device should be efficient in ensuring even discharge of the coke without cutting or shearing it. Furthermore, it is important that the rate of extraction can be simply varied. The Woodall-Duckham helical star-wheel extractor is a device sufficiently well known to make any detailed description of its principle superfluous in this Paper, but it may be of interest that as far as the device itself is concerned, it is in all essentials the same to-day as it was when it was patented in 1908, the only modification having been in details of driving gear. We have had no trouble in our experience of it at Tredegar.

The extracted coke falls into a bottom hopper beneath each retort of capacity approximately equal to two hours' make of coke. It is here lightly quenched by means of a water spray set so as to ensure that the coke is discharged dry and cool and with little dust. The discharge is effected by means of a water-sealed quadrant door. The working conditions beneath the retorts are thus very good.

The two producers are each large enough to supply the gas for heating four retorts. They are independently controlled, and either can be shut down without interfering with the other. At the same time they are interconnected and gas from either producer may be taken to the heating flues of any of the retorts.

The producer fronts are fitted with doors so that they can be worked under pressure, the primary air being injected by means of steam through venturis. Flexibility of producer gas output is thus attained and fuel of low quality can, if desired, be used. The step-grate type of producer is easily worked and practically no clinker trouble is experienced. The fires merely require pricking up at intervals of four hours or longer, depending on the fuel used, to keep them in good condition.

The waste combustion gases from the settings are passed to a waste-heat boiler of the Cochran vertical type. This raises steam at 100 lb. per sq. in. pressure. The boiler is of a rather larger size than can be kept at full output by means of waste heat from the present six retorts, the aim of this being to cover the possibility of a future extension by two retorts. This extension has, however, not yet proved necessary. In order to be able to work the boiler at full output, pending the extension and also at any time when retorts might have to be let down, recourse was made to an expedient of which ours, I believe, was one of the earliest examples. An auxiliary flue was installed from the producers to the waste gas main and by this means a supplementary supply of producer gas can be admixed with the waste gases on their way to the boiler. This producer gas is burnt under ideal conditions by means of the oxygen entrained in the hot waste gas stream. This method has proved eminently successful, and has, I believe, been widely adopted elsewhere. In the earlier years of the operation of the plant, it was invaluable to us to be able to fulfil any demands for steam up to the full capacity of the boiler. More recently, however, with the growing demands for gas, our average daily make has increased considerably and the average number of retorts in operation is correspondingly larger. We have, therefore, not experienced the same necessity for producer gas augmentation for our boiler,

although it is a comfortable feeling to have this expedient in reserve.

Gas Collecting System.

Gas is taken off from the top of the retorts by means of a cast-iron gas offtake pipe fitted to one end of each retort; each offtake is provided with a special mushroom type valve, so that the respective retort can be shut off entirely from the rest of the system at scurfing times. The gas passes through the offtakes into hydraulic mains, one of which is provided along each side of the bench at about the top of setting level. Each main has an adjustable tar overflow with a tar main attached, and the gas outlet from each hydraulic main is connected up to a foul main. Sprays are provided in this foul main for hot liquor spraying of the gas, but, owing to local circumstances, we are using mains water instead of liquor in these sprays. This has proved reasonably satisfactory, but, owing to the use of water instead of liquor, we have found that tar settles in the bends of the tar downtake and causes obstruction. This has been very easily overcome, however, by periodically steaming the pipe.

Coal and Coke Handling.

Before passing on to a discussion of the working of the plant, I propose briefly to describe the coal and coke handling services. The general scheme is as follows:

Coal is brought in railway wagons on to the siding and hand discharged into a small receiving hopper arranged at the rail level. From this hopper large coal is fed into an 8-10 ton per hour two-roll coal breaker by means of a jigging feeder fitted with a screen. Small coal passes direct through this screen and, by means of a by-pass, into the delivery chute underneath the breaker. The broken coal and the small coal by-passing the breaker are fed into a 10 ton per hour cased-in bucket elevator, which delivers it into a steel overhead storage hopper above the retort bench. This hopper has a capacity equal to 48 hours' supply to the plant. From this hopper the coal is discharged through special rotary valves into auxiliary supply hoppers fixed to the top mouthpieces of the retorts. From these auxiliary hoppers, it falls by gravity into the retorts at a speed governed by the rate of coke extraction at the bottom. The water-sealed doors beneath the retorts are discharged by hand at two-hourly intervals into a side discharging skip. The coke required for the producers is taken in this skip into a 25-cwt. steam driven lift and elevated to the producer charging platform. At this level the skip is run out of the lift on to cast-iron plates laid on top of the producer brickwork, and the coke is discharged direct to the charging holes of the producers. Surplus coke is also taken by means of the skip into the lift and elevated to the level of an outside gantry. It is run out of the lift along this gantry, which extends for about 68 ft. from the retort house, and is discharged either into railway wagons or into open store. In the event of the coal breaker and elevator being out of commission, small coal is delivered into the storage hoppers above the retort bench by means of the skip and the lift.

Upward Heating System.

When the upward heating system was adopted, a number of advantages were regarded as being likely to accrue from the change.

1. As the temperatures in the upper portion of the heating flues were reduced, the cold coal entering the retort is heated gradually; thus the temperature differential between the inside and the outside of the walls in the upper part of the retort is narrowed, and one of the main sources of erosion is thus for all practical purposes eliminated. Moreover, the reduction in temperature allows the silica belt to be shortened and fireclay construction to be substituted in the upper part with perfect safety. By the time the coal enters the shortened silica belt it has acquired sufficient heat to eliminate an excessive temperature differential, and spalling of the silica is avoided. It is, therefore, claimed that while the high efficiency associated with silica construction and high temperatures has been retained, brickwork maintenance costs have been greatly reduced. Our five years' experience at Tredegar certainly gives practical support to that claim, for no serious spalling has occurred and the only repairs that have been necessary to the retort brickwork have been the pointing of two retorts and the patching of a few courses in the lower portions of the silica zones in these retorts.

2. The second advantage which was looked for from upward heating was improved ease of coal travel. The more gradual heating, referred to above as resulting from the lowering of the high-temperature zone, prevents undue swelling of coal in the upper part of the retort. We have had little or no difficulty with the travel of the coal we handle at Tredegar, but I am bound to admit that the swelling characteristics of that coal are not such as would test this claim to the utmost.

3. The zoning of temperatures obtainable with the upward heating system is claimed to reduce scurf formation to a minimum. I am glad to be able to say that loss of time for scurfing at Tredegar is very small indeed. Retorts can go for a very long period before having to go off for scurfing; indeed, it is on record that one retort after working for eighty-two days was put off gas making owing to make being in excess of demand. When emptied and examined, this retort showed only a very thin layer of scurf.

4. It was expected that the change to upward heating in the vertical flues would improve thermal yield per ton of coal. In the first place, the lower top temperatures would prevent overcracking and would contribute to a higher total methane content of the gas. Secondly, the lowered high-temperature zone would result in the best conditions at the bottom of the retort for securing a good steaming reaction.

When the plant was nearing completion, the Colliery Company from whom we obtained our coal decided to close the particular colliery, with the result we could not obtain, locally, a recognized gas-making coal. My Council was exceedingly anxious to use coal mined within the Urban District, and after experimenting we found that we could obtain fair results with a steam coal. This coal is known as "Ty-Trist" washed beans. The average thermal yield obtained from this coal, having regard to the distinctly low volatile content, is, I submit, very satisfactory. I append figures which show our average results for the year ended March 31, 1934, which is the last year for which I can offer audited figures:

Gas made	97,210,300 cu.ft.
Coal carbonized	5,686 tons
Average price of coal per ton	16s. 6d.
Yield of gas per ton of coal	17,095 cu.ft.
Average C.V. of gas	450 B.Th.U. per cu.ft.
Therms per ton of coal	76·92
Coke produced for sale	3,142 tons
Breeze ,, ,,	244 ,,
Sales of coke and breeze per ton of coal	11·90 cwt.
Tar produced per ton of coal	4·66 galls.

Coal Analysis.

	%
Volatile matter	18·75
Fixed carbon	73·31
Ash	4·94
Moisture	3·00

These results have been obtained with very little trouble. The plant is worked by one man per shift, with a second man coaling and greasing during the night. The retorts are very easy to put to work after being let down or scurfed, and, once they are in operation, the control of heating is merely a matter of occasional slight adjustments of the CO and CO_2 dampers, these adjustments being made at two levels only. Furthermore, owing to the vertical flue construction, the inspection of flue temperatures is a very simple matter, as the whole of the vertical flues can be inspected from one level only—namely, the top charging platform.

For the small and medium sized works, in my opinion, the upwardly heated continuous vertical retort offers the most satisfactory solution to the production problems of the Engineer and Manager. I say "Engineer and Manager" although perhaps I should in the case of the medium sized works have reversed these terms, for it is becoming more and more obvious that if the Gas Industry is to hold its own, the more time that the man in charge of the medium sized undertaking can devote to management in the commercial and financial sense, the better for his trading prospects. Accordingly, the plant which can give efficient results without demanding too much of his time will ultimately redound most to the overall efficiency of his undertaking. I believe that it is in no small measure due to the efficient and trouble-free operation of our plant at Tredegar that our annual make has risen from some 72,000,000 cu.ft. in the first year of operation to over 97,000,000 cu.ft. in the year ended March 31, 1934.

In ensuring trouble-free operation of a carbonizing plant great assistance can be given by the manufacturer by way of after-service, and it is my pleasure to acknowledge my indebtedness to the service which I have received in respect of the plant I have just described to you. The frequent visits of various Technical Representatives, with the subsequent Reports on such visits, all tend to the maintenance of efficiency in both plant and staff, and I cannot speak too highly of this service.

So far so good, but, after all, although the Gas Industry can safely claim to be operating in the National interest to-day, as in days of old, "the labourer is worthy of his hire," and we therefore look for some tangible result of

our efforts, and in this respect, I think you will agree, we are not doing badly in Tredegar.

The financial results for the year ended March 31, 1934, were as follows:

Gross profit		£6,114
Less—		
Loan charges	£2,997	
Income-tax	938	
Capital work	610	
		4,545
Net profit		£1,569
Price of gas to ordinary consumers		8·55d. per therm
,, ,, prepayment ,,		22 cu.ft. a penny
Average price realized for coke		9s. 11d. per ton

In conclusion, although the man in the street, who cannot be expected to understand these matters, is of the opinion a mistake has been made, I am exceedingly glad our works were remodelled before the introduction of electricity to Tredegar, otherwise, I am afraid, our Gas Undertaking would not be able to survive.

Discussion.

The PRESIDENT voiced the indebtedness of the members to Mr. Davies for having come forward at short notice with so topical a Paper. As he (the President) had only just installed vertical retorts at Llanelly, he did not yet feel in a position to discuss the statements put forward in the Paper.

Mr. W. H. JOHNS (Swansea) remarked that Mr. Davies was to be congratulated upon being a pioneer in installing a system which some of those present had had the pleasure of inspecting. By the upward system of heating, he had been given to understand, more economical results had been obtained. In fact, the results Mr. Davies had secured showed that he made no mistake when he took upon himself the responsibility of installing something new in the way of carbonizing plant. He was doing excellently with what could be described as pure steam coal. It happened that Mr. Davies was in charge of a works in a distressed area, and his Gas Committee had done quite rightly in retaining in their own district the money spent upon coal. The Paper had not been prepared with the idea of recommending a particular type of setting for all circumstances; for in different places there were varying conditions which called for different kinds of setting. They had to thank all those who were engaged in evolving scientific methods of carbonizing for placing at the disposal of gas engineers plant which enabled them to secure better results in any circumstances in which they might find themselves placed. In this way, they were conferring great benefit upon the whole Industry. He noticed that the make of tar at Tredegar was very low, due doubtless to the fact that they were carbonizing steam coal. When some of them looked at the volatile content, they would feel thankful that they did not have to carbonize coal of this character. A five-year period provided a very fair basis for judging of matters like those dealt with in the Paper. Mr. Davies had not bored them with a lot of cost figures, but he had at the end of the Paper set out the final results, which showed that he was supplying gas at a very satisfactory price, and at the same time he had been able to give the Council a fair return on their money. Having seen the Tredegar Works, he could personally congratulate Mr. Davies upon the way in which they were operated.

Mr. E. M. EDWARDS (Port Talbot) said that, having had the opportunity of carbonizing South Wales coals, he would like also to congratulate Mr. Davies upon his results. After all, the main thing was the price at which they were able to sell gas, and in this respect Tredegar showed up well. One thing which should be borne in mind in connection with the carbonizing of steam coals in vertical retorts was that they were buying fuel at a very low price for the purpose of directly competing with low-grade coal, also procurable at a very cheap price. It was a wise move for them to try to get hold of plants that would carbonize inferior fuel and enable them to show results comparable with those obtained by users of solid fuel of a like low-grade character. The electric people used an inferior grade fuel, and if the gas-works did not do the same they started wrongly. He would like to know what the author paid for his steam coal.

Mr. DAVIES: 16s. 6d. per ton, delivered.

Mr. EDWARDS: Was gas coal ever used?

Mr. DAVIES: No.

Mr. EDWARDS remarked that a very important point was the size of unit for small works. In certain cases a mistake had been made in selecting too large a unit. Could the retorts at Tredegar be worked separately?

Mr. DAVIES: Each individual retort can be started up.

Confirmation.

Mr. EDWARDS (continuing) said they were in the same position at Port Talbot of having no solid fuel boiler. Personally, he found the upward heating system was a decided advantage. The rate of throughput was governed more by the rate of water gas production than by the rate of carbonization, and this was where upward heating was a great advantage. He had had his own plant for three years, and he could confirm the author's statement that repair costs were low. He anticipated a very long life for these retorts. What was the quantity of naphthalene in the gas produced?

Mr. DAVIES replied that he had not with him the exact figures, but they had experienced just a little trouble.

Mr. A. D. HOWELLS (Abergavenny): What is the percentage of steaming?

Mr. DAVIES answered that the conditions varied to a very great extent, so that he was unable to give this figure.

Mr. W. CLARK JACKSON (Neath) thought there was no comparison between downward fired verticals and upward firing. They had got their own make per ton up to 87-88 therms quite easily. They were steaming up to 34-35%. In the producers they were using 25% of breeze, with forced draught, and they had had no trouble, up to the present at any rate. If it was possible to get the right coal, one was perfectly safe in putting down verticals. In Neath the position of the gas undertaking had been completely changed, and this he attributed very largely to the introduction of vertical retorts. He believed that in Llanelly the adoption of this method of carbonizing would prove to be the dawn of very much happier days. In 1921, at Neath, they were turning out 115 million cu.ft. of gas; last year their production was 264 millions. It was a question of getting the plant most suited to one's own local conditions, and then selling gas to the very best advantage. Mr. Davies had done the right thing by adopting an easily operated plant which had enabled him to get his costs down and to pay more attention to the distribution side of his undertaking.

South Wales Coals.

Mr. H. D. MADDEN (Cardiff), proposing a hearty vote of thanks to the author, said he was delighted that they should have had a paper on continuous verticals for small gas-works. It was 21 years since verticals were installed in Cardiff, and an extension of them was made about 16 years ago. He had not yet had to carbonize pure steam coals—although he utilized a proportion of Monmouthshire low volatile coals—but in many cases they were good cokers, and if one got good coke formation steaming could be satisfactorily carried out. If people wanted to learn all about carbonizing, he would recommend them to try some of the South Wales coals. Many years ago they sent a trainload of coal from South Wales to St. Helens, so as to ascertain how they would operate in a small test setting there. At the end of a week it was found that the retort was well designed to carbonize South Wales coals, with slight alteration. This was made, and the first installation went in at Cardiff, which has been working 21 years. Mr. Davies had gone to pure steam coal, and had obtained wonderful results. Almost down to the smallest works, he thought vertical retorts could be used. Their own Association went to the opening of an installation at Portheawl. It was a small unit, and he believed it had been working satisfactorily ever since. If a town of the size of Porthcawl could put in verticals, there seemed to be no reason why even smaller works should not do the same.

Mr. T. WILKINSON seconded the vote, which was heartily accorded.

Mr. DAVIES thanked the members, and proceeded: Mr. Johns does not like steam coal, and the fact that we get very little tar. You, gentlemen, can have all the tar, provided you give me gas and coke instead of it. We sold in the past year 12·28 cwt. of coke per ton of coal carbonized. We have only the waste heat boiler, which supplies steam for the verticals, steam lift, steam elevator, engine room, and tar pumps and exhausters. It also heats my office, the showroom, stores, meter room, and a fairly large garage. So I think steam coal is not to be despised.

Gas Undertakings' Results

Stafford.

The Engineer's Annual Report for the Stafford Gas Department for the past year states that the gas accounted for amounts to 326,629,700 cu.ft., against 324,809,400 cu.ft. last year, an increase of 1,820,300 cu.ft., or 0·56%. The quantity of gas unaccounted for is 14,757,300 cu.ft., or 4·32%. Coal carbonized during the year amounted to 17,425 tons. The make per ton this year was 19,418 cu.ft., or 85·4 therms. Receipts from sale of gas were £53,496, against £52,895 last year. Coke sold amounted to 7·28 cwt. per ton of coal carbonized. Tar sold was 19·08 gallons per ton of coal carbonized. Residuals realized 10s. 5·115d. per ton of coal carbonized, against last year's figure of 10s. 2·509d., an increase of 2·606d. per ton of coal carbonized. Salaries and wages for manufacture were £3,198, repairs and maintenance of works cost £5,642, distribution cost £4,331, and the profit realized on the sale of fittings and heating apparatus is £981. The charge against revenue for depreciation and repair of stoves is £4,816. During the past year goods to the value of £6,123 were sold through the showroom, and included 318 cookers, 158 wash boilers, 97 fires, 29 heaters and radiators, and 34 water heaters, while 1,243 cookers, grillers, fires, &c., were brought off from consumers' premises and cleaned, repaired, and refixed. During the year 915 yds. of new mains have been laid, bringing up the total length to 66·37 miles. 266 yds. of old mains have been re-laid. New consumers for the year total 258. The total income was £63,643, and the total working expenses were £45,973, resulting in a gross profit of £17,669, which, compared with last year's figure of £16,465, shows an increase of £1,204. Owing to the increase in the rating assessment, the charge for rates has increased by nearly £500. After providing for income-tax, £2,243; interest on capital, £1,502; repayment of loans, £5,077; renewals fund, £2,972, &c., there remains a net profit of £5,924, against £3,346 last year, an increase of £2,577.

Western Junior Gas Association

Presidential Address

of

Douglas L. Copp, Assoc.M.Inst C.E.

(Annual Meeting, May 18, 1935)

THE PRESIDENT.

Mr. Douglas L. Copp was educated at Queen's College, Taunton, and subsequently studied Engineering at the University of Bristol. In 1919 he was articled as a pupil to Mr. J. Wesley Whimster, Engineer and Manager of the Bath Gas Company. In 1925 he was appointed Assistant Engineer and Manager of the Clevedon Gas Company; and in 1926 to a similar position with the Macclesfield Corporation Gas Undertaking, where he remained three years before receiving the appointment of Assistant Engineer and Manager of the Exeter Gaslight and Coke Company. His appointment as Engineer, Manager, and Secretary of the Haverfordwest Corporation Gas Department has just been announced. Mr. Copp was elected an Associate Member of the Institution of Civil Engineers in 1933, and he follows both his father and grandfather, who were also actively engaged in the Gas Industry.

There are matters of great importance to the future of our Industry which have recently been impressed upon us by the Addresses of the Chairmen of some of the largest undertakings The foremost of these is the decreasing sales of gas per consumer, which is rightly engaging the attention, not only of the seniors and leaders of the Industry, but of the juniors

Most of us will agree that of the steps to counter the decline, and to expand far beyond the 1926 level, possibly the most effective are the introduction of promotional charges, and the intensifying of sales campaigns. But there must be some causes for this decline other than the general retention of flat-rate charges, and perhaps not always first-class salesmanship; because the man in the street spends far less on gas than on his tobacco, it appears to me that other causes are at work. One of these is the arrival of what may be called a Critical Age. We find ourselves no longer able to gloss over, or wink at, things which do not attain the criterion. An example may be taken from the Railway Companies, who suffered considerably some years ago because they attained a reputation (quite undeserved) for being slow and late in their services.

An interesting feature of the new critique is that it does not require quite continual perfection; the motor car is not discarded because once in one thousand times the engine refuses to start; the owner is content that the car was perfect those 999 times he has used it.

This is the reason why electric lighting is not displaced by gas as a result of one of the numerous electric "black-outs." In the opinion of the consumer, at any rate, electric lighting has been so perfect while the power has been available that he may forget or dismiss the thousandth time when he groped for candles in the dark.

If this is accepted, it leads us to think that the slogan "Gas the never-failing service" is not all it sounds, seeing that the consumer is interested not only in the supply of gas, but in the apparatus which may, or may not, enable him to use it.

With regard to domestic lighting, I feel quite certain that with the many things that can go wrong with the mantle, burner, or glassware, that in most instances the consumer cannot continuously use in the best manner the gas for which he pays It is in public lighting that we are now doing well, and it is being done well largely because each lamp is receiving almost daily expert attention and without this attention efficiency cannot be maintained. It has to be admitted at once that such attention could not be given to domestic burners, so one turns to consider what means of eliminating trouble can be adopted.

I do not believe that any great revival of gas lighting can take place until a more satisfactory vehicle than the mantle is made available, and I cannot think that by employing the finest brains in research that an alternative means of using gas for lighting cannot be found. This should be as great an advance on the incandescent mantle as that was over the naked flame.

Nothing to Adjust.

The electric lamp has the advantage of not having anything to adjust, and it is supplied with a heating agent at a fairly constant voltage; these are real selling points, indeed, they may be called satisfaction points. There does not seem to be any reason why an immediate start could not be made to improve matters by standardizing nipple orifices and air ports and scrapping adjustments. I am aware that this is being done by some important undertakings, but in order to ensure success it will be necessary to fix a small gas governor over each burner, on the lines of public lamps.

These improvements cannot be thought out by those immersed in day to day routine, but only by those with time to think of the needs of the future and how they should be met.

The valuable lighting load can be retained and extended but action must come quickly I do not believe that among ourselves we should shut our eyes to the fact that the present day electric lamp scores over its rival in total absence of annoying adjustments and in its supreme ease of replacement. Space we can recover, but time never.

Apart from technical efficiency which has not recently advanced, there have been some noteworthy improvements in lighting fittings. Formerly many of these may best be described as burners suspended on to pieces of brass tube, but that type is now likely to disappear fast. Improvements which come easily to mind are the abolition of lever cocks and chains, and the general adoption of fitting burners to pendants and brackets by means of bayonet sockets. The latter so greatly facilitates removal of the whole burner and appurtenances for cleaning or fitting new mantles, enabling the operation to be performed in comfort, and be as easy as fitting an electric lamp.

In an age which also requires automatic action we regard the gas switch as more a necessity than a luxury, and where possible it would be well to regard the switch as a necessary part of the lighting fitting, to be sold and fixed with it. Those makers of switches which require a by-pass should devote attention to a by-pass which will not readily blow out in a draught. Similarly it is up to our manufacturing side to eliminate gum troubles, and, I may also say, organic sulphur. With the comparative cheapness in terms of cost per therm of high-pressure feeders there is a means of avoiding such variations of pressure in distributing mains as has been common in the past, and which obtains to-day. Nothing can be more harmful in the Industry than by-pass failure, due to the very noticeable accompanying smell.

It is necessary for every one of us to acquire as quickly as we may a considerable technical knowledge of the manufacture and use of rival commodities.

Any salesman or engineer who is detected by the prospective customer making a technical slip in relation to a rival product may say he has lost his case before he has begun to formulate it. We should not forget that the general public of our own age are better equipped to judge

a scientific argument than those of an older generation. National organizations help us by providing competition points, which are exceedingly helpful, but we must go a stage further and become competition-minded—that is, have a clear view of the case which will be put by the other man, as well as the case we put for ourselves.

Generally speaking, in their respective spheres, gas and coke are so superior to their rivals that we should always be honest and plain speaking to the prospective customer; if we cannot for some particular local reason conscientiously advocate our own article, it is better to say so, and pass the business by.

Progress in Appliances.

When we come to consider all kinds of apparatus for the use of gas as a heating agent, we find that continuous and noteworthy progress is being made. The gas cooker is of good appearance, automatic in the action of the oven, and so efficient that it is said to be one of the principal causes of decreased sales. The gas water-heater is obtainable suitable for any set of conditions likely to be met, and there is little criticism of these to be found, rather may one criticize the manner in which, all too often, they are fixed. Water heaters which cannot be lighted in certain winds, cooker ovens which blow back with an inrush of air from outside the house, are common, and if we are to enjoy prosperity and expansion of business these troubles must be eliminated. If oven flues cannot give efficient service, they should be dispensed with.

I am of the opinion that some advantages may be reaped by robbing the flue gases of gas fires of some of their heat and turning it to useful account. Efficient as the gas fire may be, in order that it may become the principal method of heating the rooms of all classes of consumers, heating by gas must be made cheaper. This can be done by a still higher efficiency or by lower charges for the fuel. From our point of view the former is preferable, and I suggest that the surplus heat over and above that necessary for draught could be turned into the room. Without complication, which means expense out of proportion to the advantages gained, I think it possible, particularly in the case of new buildings, that tubes may be put into the flue which would discharge warm air back into the room at a level about 2 ft. below the ceiling. This current of warm air should then flow across the upper part of the space, and, descending on the side of the room remote from the fire, help to alleviate that " cold back " feeling which is a disadvantage inherent in all radiant heaters.

There is a revival of interest being taken in small gas engines, and I have had working experience of one of the new totally-enclosed high-speed engines now available which indicates that it is a serious rival to the electric motor. Another new development is taking place in the adaptation of motor car engines to run as stationary prime movers, with gas fuel; they are likely to gain considerable popularity.

I alluded earlier to what I called satisfaction points, which I describe as a catalogue of advantages which the consumer appreciates from a lengthy trial of his appliances, as against selling points, which are what he is told before he buys.

The consumer's satisfaction is registered in considerable measure by negatives, for example in the case of a gas fire, some of his points may be " this fire never makes bubbly noises, or lights-back; the firebrick back has not cracked, we have never had any smell with it."

The Work of the Fitter.

This brings us to consider the work of the fitter and his supervisor, in whose hands lie almost the whole making or marring of the consumer's approval Definite encouragement should be given the fitter to perform all his work to the highest possible standard of excellence There is a wide gulf fixed between the style of workmanship which is the lowest level which will avoid trouble with one's superiors, and the high level which can be obtained, and which must be attained, if the performance of modern apparatus is not to suffer.

I think the time has come when fitters and collection and index takers should be uniformly dressed The usual policy is to supply a uniform cap, and the rest of the clothing is left at the discretion of the employee. It so happens that these men are the ambassadors of gas with whom the public is most familiar; in spite of intensive canvassing and census-taking by trained salesmen, they are the men by whom we are judged. There is no disgrace in a uniform, indeed it should be a source of pride as it is with the King's. If the idea was introduced in the manner in which I suggest, there would be two branches of results. One branch is the effect on the wearer, the other the effect on the public.

Dealing with the former, and always assuming that the suit is smart, dignified, and practical, there is no doubt that the whole tone of the individual would be raised, and the quality of the work would correspond. The snags are that after arriving at the place of work, if the job was dirty an overall suit must be put on over the uniform; and there would be considerable expense to the Undertaking in providing the clothing. I do not suggest that fitters engaged in carcassing must take off their overalls whenever they are not actually at work; reason must be shown in these arrangements.

There can be no room for doubt as to the effect on the consumer. His whole appreciation of the organization behind the man would increase, and the prestige gained would be of incalculable benefit. If the employee is, as he should be, equipped for the introduction of new business, I am convinced that he would find himself half way to success in each of his endeavours. If we want to visualize the effect of uniformity in clothing we have only to think of the difference we feel when the vicar calls in plus fours instead of his clerical garments. Clothes make the man.

We are not taking advantage of all the means of publicity which are presented to us by the vehicles which are part of the equipment of all undertakings. Even the humble fitter's service cart could be put on pneumatic tyres (which would be a boon to the workmen) and emblazoned with a slogan such as " Gas—the silent service." Vans and lorries should be kept in the very best condition of running and appearance, and the advertising matter to be displayed on them might well be designed by an expert in such matters.

I am a believer in what is known as " stunt " advertising, which can be practised with advantage, subject to a decent limit and the preservation of dignity.

At no time in our history have there been so many removals of population from town to town, and this new feature makes it more imperative that all Undertakings should strive for perfect service. This would minimize the effect which one comes across of being turned down in canvassing a potential new consumer because in the last place of residence he formed a bad opinion of gas service generally.

I have devoted some time to sales-service in this Address, because I am convinced that the successful undertakings of the future will be managed less by pure engineers than by those who have a thorough engineering and scientific training coupled with the valuable ability to cultivate by various means a 100% body of satisfied, enthusiastic, gas consumers.

What a prospect opens before us when we consider the effects which would be produced by having some hundreds of enthusiastic gas-minded consumers in each undertaking's district.

Reverting to the allusion to the present prevalence of removal of families from place to place, it was mentioned that there are frequent cases of people getting a bad impression of gas by being unfortunate in living in a district where gas service is not developed. Generally speaking, these are the areas of the smaller undertakings, and the correction of this phase is one of the advantages I see from amalgamations. In the areas of the Junior Associations are many independent small undertakings, and by far the greater number are managed with economy and success; they have not the means to adopt the service organization of their large neighbours, and if it is not presumption on my part to suggest it, I hope the District Association will be able to formulate a scheme to help them by co-operative action and not leave it all to the apparatus makers. I know I am expressing the desires of all members of this Association in saying how much we would welcome those qualified to join us as members who are associated with the smaller works in our area.

Need for Other Attributes than Technical Efficiency.

Turning to the objects of our Association as set forth in our Rules, we find that the first is " To promote the general welfare and to extend the technical knowledge of the members ; " again later, " to discuss matters of general interest to the Gas Industry." With a due sense of responsibility, and acknowledging the probability of my view being attacked as unorthodox and unprofitable, I suggest to you that as Juniors we are paying too much attention to advancing technical knowledge, and, in proportion, insufficient to the consideration of Gas Politics and Management, which we hope some day to direct when we become Seniors. There will be attributes other than technical proficiency required of us then which we might well start to develop now. Technical education is of little value unless accompanied by sound judgment and bold initiative; it will not endow us with commonsense, nor will it make our opinion on a multitude of important subjects worth more than that of a naturally observant person. I would like to paraphrase some sentences of a most apt character which I recently

ead, in the Presidential Address of Sir Henry Maybury to the Institution of Civil Engineers:

"However good and accurate an engineer may be, unless he has a good command of the English language and can write an intelligent report, explaining in concise and logical order the details of the case entrusted to him, he will not succeed.

"He should endeavour to cultivate an accurate mind, to think and express himself clearly both in writing and in conversation, and to display good manners, showing confidence without being aggressive. . . . I fear that there are many who, once they have passed the qualifying examination of the Institution, and have been elected to Membership, feel there is little more to learn, and do not appreciate that what they have achieved should be considered only a prelude to greater endeavours, and thus to greater successes."

As Juniors we have to take practically no ultimate responsibility in the management of our respective undertakings, which is borne by the Seniors. Then the day comes when we suddenly find ourselves numbered among the latter, for which we must come prepared. We should therefore give ourselves time to think now of all aspects of general administration and control, and study matters other than technical and scientific. I have heard it said that the official who shirks responsibility is often promoted as being a "safe" man, and the man who does next to nothing may be sure of doing no wrong, and his career will not be endangered. This cynical view of things will never bring success to our Industry, which is proved by the growing call to "take risks" in introducing promotional charges. Hitherto the Gas Industry has been comparatively sheltered, but it is now exposed to a fierce competition on all sides which is certain to increase in intensity as time goes on, and which the members of this and similar Associations will have individually to fight.

Do not always let us "play safe" then, but take risks with prudence and judgment in all we undertake in furthering the expansion and stability of this great Industry. Capacity to act on risk is perhaps the instinct through which have come to us most of our gains by human endeavour. The Gas Industry is hampered by having traditions, and some of these, unfortunately, are kept with an almost religious zeal.

INCIDENTS AND SEQUELS IN Gas Manufacture

by C. A. NEWHAM

In this Paper Mr. C. A. Newham, of Leeds, put before the members of the Yorkshire Junior Gas Association, at their meeting at Wakefield on May 18, some observations of incidents appertaining to the manufacture of gas at the Meadow Lane Works of the Leeds Gas Department.

The coal gas producing plant at the Meadow Lane Works of the Leeds Gas Department consists of:

	Capacity.
One bench of West's 33-in. continuous vertical retorts,	2½ million cu.ft.
One " " 50-in. " " "	3 " "
One " Dempster Toogood " "	1½ " "

The question of stacking large quantities of bituminous coal is always one which must of necessity command serious attention if spontaneous combustion is to be avoided. I do not propose to dwell on the aspects of the various safeguards, since there is a wealth of information on this subject. I would, however, like to stress one or two points for your consideration which have impressed me in connection with coal stacking.

In addition to the main precautions to be observed—namely:

(*a*) Chemical composition of coal.
(*b*) Avoidance of mixing different classes of coals in the same heap.
(*c*) Avoidance of mixing different sizes of coal in the same heap.
(*d*) Height of coal stack.
(*e*) Position of coal stack, &c.

I would emphasize that the manner in which the coal is handled when being put into stock is of the utmost importance. The formation of dust or fines must be reduced to a minimum, for, in my opinion, the formation of freshly ground dust invariably leads to spontaneous combustion.

By this I mean that, no matter what care is taken in the selection of a suitable size and class of coal for stacking, if the manner of handling is faulty in this sense, the possibilities of spontaneous combustion are greatly increased.

I have known cases where newly formed dust, with a depth of only 3 in., has resulted in firing in a few days' time.

The question of methodical inspection of coal stacks is essential. The practice of inserting wrought-iron tubes in the heap when stacking is certainly to be commended for facilitating temperature readings, but from experience I would certainly recommend, in addition, M.S. inspection rods, ½ in. square in section, which should be moved from place to place at frequent intervals. I make a point of this because on one occasion it was found that the highest reading obtained in a temperature tube was 63° F., and an iron rod situated less than 3 ft. away was too hot to hold by the naked hand.

And now further observation of the behaviour of a coal stack with which I am familiar. This stack of coal, some 7,000 tons capacity and piled to a depth of 18 ft., is situated in a rectangular building which has an opening at each end facing north-east and south-west respectively. The coal stack is comprised of one class of coal having a size of 1 in. by ¾ in., and was put into stock with every due care early in 1930. Temperature tubes and wrought-iron test rods were inserted and all rods have been subject to weekly inspections and also temperature records have been kept.

The interesting point of this record is the fact that during the autumn of each year there has been a definite increase in temperature which has subsided again before the beginning of each year. The most notable increase was confined to a section of the heap approximately one-third of the distance from the south-west end, and the hottest section was about 3 ft. to halfway down the heap. In one instance only has the temperature increase occurred in the same spot twice, although the main fluctuations are confined to a localized area. This peculiarity of local temperature waves has also occurred with other coals which have been previously stacked in the same building. It would not be policy to venture a definite explanation as to the cause, but it may be due to the prevailing wind causing an air current which has a critical flow in this particular area, during periods when the average day temperature is lower than that of the heap, which will assist upward currents of air to take place.

Automatic Cut-Outs for G.B. Conveyor.

The idea of fixing automatic cut-outs to the gravity bucket conveyor came into being through the constant trouble caused by the coke discharge bogie. The design of this bogie was such that the rotary filler was made to rotate by the gravity bucket conveyor. The motion was transmitted through a large sprocket wheel working in the conveyor links, and it was the fouling of this sprocket, when unattended, which caused the bogie to be carried down the retort house and often resulted in damaging the conveyor.

Several ideas were tried to obviate this trouble, and the most successful was the following arrangement:

A switch was fitted in the same circuit as the usual emergency switches, and fitted to this switch was a projecting arm which operated it when the arm was moved over. The arm was placed in such a position as to be operated by the bogie should it move from its set position. If the bogie moved it immediately caused the projecting arm to throw out the switch; this in turn operated the no-volt release of the starter, therby causing the conveyor to stop.

This design of coke discharge bogie has now been replaced by the ordinary lip bucket filler, but the system of

cut-outs has been extended to other sections of the conveyors (see fig. 1). In all, some five of these cut-outs are in use, two situated above the coke-tipping cams so that any bucket not returning to its proper position, due to fouling with large pieces of coke, &c., will operate the switch and stop the conveyor, thus preventing possible damage. Two more are fitted above the turnover pulley, and, should the buckets not turn over properly, safeguard from extensive damage is assured. Another cut-out is placed at a salient point on the side of the conveyor which will stop the conveyor should there be a broken or projecting axle.

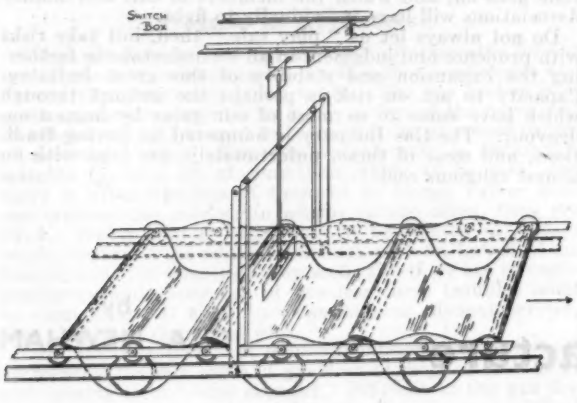


Fig. 1.

A Typical Automatic Cut-Out Adapted to G.B. Conveyor.

I have no hesitation in saying that these simple devices have proved invaluable, and on several occasions have prevented serious breakdowns and have amply repaid their initial cost of installation; and the upkeep, I might say, is almost negligible.

In addition to the automatic cut-outs already explained, there is a system of signal lights and alarm bells which are used for the purpose of ensuring the safety of the workmen. No undertaking can afford to neglect any measure which will further the safety of its personnel, especially where extensive conveyors are in use.

Elimination of Coke Dust During Discharge.

The possibility of reducing coke dust during discharging of coke receptacles was considered by the management, and Messrs. Wests designed and fitted auxiliary water sprays to each coke receiving chamber. The results proved beneficial, especially when steaming at a fairly high rate.

Water is injected into each coke receiving chamber by the medium of the ordinary steam supply, water to the injectors being supplied from an overhead tank fitted with a ball cock which ensures a constant head of water in the usual way. The flow is regulated by passing through a $\frac{3}{32}$ in. orifice, which is fitted in the pipe line just prior to each injector.

The solving of one problem often gives rise to the unexpected, and, in this case, it was found after a short time that the make of liquor increased to almost double the normal quantity. It was first thought that excessive steaming through the ordinary channels was responsible, but this was soon discounted since all steam to the retorts was measured, as water, prior to evaporation by the waste heat boilers, also finally regulated and checked by Wests-Taylor regulating valves and gauge pressures.

Attention was given to the water consumption of the spray system, and it was found to be 17% of coal carbonized. This was disposed of in the following manner:

	% of Coal Carbonized.
Water absorbed by coke (2½%)	1·6
Water dripping from mouthpieces	6·0
Water entering retorts as steam (by difference)	9·4
Total	17·0
Steam passing into retorts—	
By ordinary steam supply	16·0
Steam formed from water sprays	9·4
Total	25·4

9·4% of steam per ton of coal carbonized is equal to, approximately, 21 gallons of liquor per ton of coal, which coincided with the original finding.

The water head to the sprays was then reduced, also the ordinary steam supply, to give a total amount of steam passing through the coal charges of approximately 16% of coal carbonized.

Since the foregoing figures were compiled, the installation of a benzole plant has necessitated an increase of calorific value of the gas from 470 to approximately 495 B.Th.U. and the average rate of water and steam to the retorts is as follows:

	% of Coal Carbonized.
Water to sprays—	
Water absorbed by coke (2%)	1·3
Water dripping from mouthpieces	2·4
Water entering retorts as steam	3·0
Total	6·7
Steam passing into retorts—	
By ordinary steam supply	7·5
By evaporation of water from sprays	3·0
Total	10·5

Typical analysis of crude gas from retorts—

	%
H_2S	0·6
CO_2	2·0
C_mH_n	2·0
O_2	0·3
CO	15·0
H_2	53·1
CH_4	21·9
N	5·1
	100·0

In view of the saturated condition of steam entering retorts, the foregoing analysis may raise some criticism as to the value of superheated steam for the production of water gas in vertical retorts. It would seem that superheated steam has little or no advantage over saturated steam when steaming at comparative low rates—say, for the production of a crude gas above 500 B.Th.U. per cu.ft.

Spiral Chutes in Coke Bunkers.

There is no need for me to emphasize the importance of supplying a good class of coke, containing a minimum amount of smalls, to be able to compete in the present-day coke market.

In addition to the primary screens, many works are equipped with de-breezing screens by which the removal of smalls, just prior to loading, is facilitated. This is an excellent device, and is to be highly commended since it ensures the loading of a good clean coke. There is, however, an important fact which is sometimes overlooked, and that is the amount of wastage of large coke due to breakage by the fall from the primary screens to the storage bunkers. This question was raised some time ago in connection with the handling of coke at the Meadow Lane Works. The vertical distance from the primary screens to the bunker floor is some 25 ft., and on re-grading coke drawn from the bunker after passing over 1¾-in. mesh, it was found to be of the following sizes:

	%
Over 1¾ in.	76·0
Through 1¾ in. and over 1 in.	15·0
,, 1 ,, ,, ½ ,,	1·5
,, ½ ,,	7·5

It was clear that the adoption of some measure capable of reducing this obvious breakage and reduction in coke value should be considered and the installation of cast-iron spiral chutes was decided upon.

The spirals were erected singly in each bunker compartment, coke being fed to the spirals by the usual chutes with renewable cast-iron liners. The spirals terminate some 3 ft. above the bottom discharge doors. This, in my opinion, is an important factor.

The spirals are made up of 12 sections or quadrants of 90°, each section being secured by three bolts top and bottom and also held rigid by vertical tee bars; they are suspended from a top joist and supported by a main bottom joist, the latter being reinforced by concrete to prevent corrosion and abrasion.

It may be an advantage to point out one or two essential features which should be considered when choosing spirals of this description.

(*a*) The design which should give a fair length of service and the renewal of worn parts should not be too costly.

(*b*) The minimum angle of the spiral should be such whereby it would be impossible for coke to remain suspended and thus cause backing up. Angles of lesser degree will be sufficient to carry the coke if given an initial momentum, but should the coke become stationary by reason of the bunker filling, it is quite feasible that hanging-up trouble will occur.

Further tests have been carried out with and without spirals to ascertain the amount of saving. The tests have been carried out as follows:

Approximately 15 tons of coke were screened in the usual

way, and all coke passing over a 1½-in. finger mesh was deflected from the screen tray into two chutes which were situated at each side of the screen tray. One chute supplied coke to a spiral chute erected in a bunker compartment and the other chute projected the coke directly into another bunker compartment without the use of a spiral. The coke was drawn from each of the bunker compartments into carts and weighed just in the same manner as supplied to customers and then tipped into two separate heaps.

All the large coke was then removed by "14-pronged" hand forks, and the smalls that remained from the two heaps were separately passed through hand sieves of ¾-in. square mesh, all over ¾ in. being rejected and what remained was screened. The results are shown in Table I.

TABLE I.

—	Smalls from Coke After Passing Down Spiral Chutes.	Smalls from Coke Without Use of Spiral Chutes.
	%	%
Through ¾ in. and over ½ in. .	1·6	1·5
Through ½ in.	1·9	7·5
Total	3·5	9·0

It will be seen that there was a definite reduction of breeze made by using spirals to the extent of approximately 1 cwt. per ton of coke.

Over a period of two years the cost of renewals and maintenance of the spiral chutes works out at approximately ½d. per ton of coke handled, and, taking into account the increased value of the coke by their use, I think you will agree that the installing of spiral chutes is fully worth while.

Multi-Tubular Waste Heat Boiler.

The installation of a waste heat boiler of the multi-tubular fire tube type gave rise to some concern on letting down after a brief run of several weeks. The boiler was let down slowly and with the usual care, but, in spite of every precaution, several leaks occurred at the junction of the tubes and the tube plate at the inlet end of the boiler.

At first it was thought that the trouble was due to insufficient expansion of the tubes during the erection of the boiler. The tubes were expanded and the boiler was again put to work after cleaning, but the same trouble occurred the next time the boiler was put out of action, although every possible precaution was taken. It was then thought that the trouble was due to scale formation on the water side of the end plate and tubes, although the maximum thickness of scale at these parts was approximately $\frac{3}{16}$ in. in thickness.

I might say at this point that the water in question had only about 2° of hardness, and hitherto the question of special treatment had not been considered necessary. However, it was then decided to treat the water, and special attention was given to the soluble solids present which were kept below 100 grains per gallon by constant blowing down. At a later date a continuous blow-down was installed, and after six months' continuous running the scale on the end plate did not exceed a thickness of $\frac{1}{16}$ in.

It is also satisfactory to note that there has been no further occurrence of tube plate leakage although the boiler in question had since been subjected to far greater conditions of stress.

Carburetting of Water Gas.

The carburetted water gas plant at the Meadow Lane Works consists of four machines, two by Davison & Partner, one by Humphreys & Glasgow, and one by Economical Gas Apparatus Construction Company. Until recently it was not possible to ascertain exactly what were the results of the plant since a stream of coal gas was measured by the same meters.

This system has now been changed and the actual results of the plant were found to be only moderate, and certainly justified some consideration of possible improvement of results.

The oil-spraying system of one of the machines was first altered from the usual single type spray to duplicate sprays, approximately half the capacity of the original. The alteration was simple and easily carried out.

Each spray was made and calibrated to pass a maximum of 6 gallons of oil in 3 minutes at a pressure of 70 lbs. per sq. in., which was deemed to be ample to give the usual calorific value—namely, 470 B.Th.U. per cu.ft.—required.

The main standard central spray was removed and in its place was fitted a sight tube and cock. The 2-in. sight hole and the 2-in. auxiliary hole in the carburettor casting were then fitted with a piece of 2-in. W.I. pipe projecting into the carburettor approximately 20 in. The sprays were attached to a ½-in. pipe which passed through the 2-in. tubes to within about 1 in. of the end and were screwed into the main casting by a plug which had been previously drilled out to take the ½-in. spray pipe. The spray pipes were then connected by ordinary unions to a tee-piece, the tee-piece being flanged and bolted to the existing spray cock on the oil supply.

The resulting improvement of this particular machine was surprising, and, after one month's work, the thermal yield per gallon showed an increase of 0·24.

Below are the results of this machine, taken over two periods, before and after alterations to the oil sprays. The figures were taken from the returns during the year 1933 at periods when this machine only was at work, and in order to give conclusive data, both periods of a necessity cover several months.

—	Total Gas Made. Corrected.	Total Oil Used.	Average C.V. per Cu.Ft., Gross.	Galls. of Oil Used per 1,000 Cu.Ft. of C.W.G. Made.	Therms per Gallon.
	Cu.Ft.	Galls.			
Previous to spray alterations . .	113,277,000	195,365	465	1·724	1·242
After alterations to spray . . .	108,682,000	160,521	468	1·476	1·433

The following observations made while the plant was in operation may be of interest:

1. The chequer brickwork directly below the oil sprays retained its incandescence during the gas run period.
2. No traces of oil gases were visible on opening of the stack valves.

Sixty to ninety seconds is the usual period between shutting off the oil and opening of the stack valve at the end of the gas run. It has been found that this period has to be reduced to 20 seconds before traces of gas are visible on opening the stack valve.

The importance of the economics of blue water gas carburetting has become a much-discussed subject. Approximately half the total cost per therm of, say, a "500 B.Th.U." carburetted water gas can be accounted for by the oil used, so that any improvement in the carburetting efficiency is of relatively greater importance than any other consideration, and I am of the opinion that there is still much to be done before the maximum efficiency of carburetting of blue gas is attained.

Discussion.

The PRESIDENT (Mr. Ralph Halkett, Junr.) said that in regard to coal stacking, his experience was that coal stacked in the open air rarely showed any increase of temperature after the first six months, but coal stored in buildings or confined spaces would heat up quickly if there was any possibility of air getting to the lower portions of the stacks through holes or crevices in the walls. This, he said, had been proved on many occasions. Again, coal stored in the open did not maintain such a high average of temperature as that indicated in the Paper, but ranged between 52° and 56° F. In regard to automatic cut-outs for the gravity bucket conveyor, at Sheffield they had had electrical cut-outs of this kind for many years past. They became essential, as partially filled buckets fouled the rotary fillers and caused serious and expensive damage, with consequent additional cost in extra handling of coke from the retorts and inactivity of the coke screening plant. On the gravity bucket conveyors of which he was speaking the cut-outs at the side of the conveyor were unnecessary, as, owing to the design, an axle which broke could not project beyond the side of the chain. Alongside all the conveyors, at suitable points, emergency remote-control cut-outs had been fixed so that the entire plant could be stopped without the attendant having to go back to the starter to do so. This was particularly necessary as one of the conveyors concerned was 720 ft. long and operated at three different levels.

In the matter of eliminating coke dust during discharge, Mr. Halkett said on the W-D retorts water sprays were used at first for cooling the coke and keeping down the dust, while superheated steam was used for making water gas and was taken into the retort itself through special ports situated some distance above the bottom of the retort. It was found later that the water sprays tended to crack the bottom castings, so their use was discontinued and the steam jets were taken from their original position and substituted for the water sprays. Water was then only used for the bottom door discharge seals. The steam used was still superheated, but the alteration thoroughly justified itself, as the carbonizing results were equally as good as before, the bottom casting kept intact, the coke-quenching was completed efficiently, and there was no increase in dust trouble. As saturated steam was not used,

no figures were obtained which would indicate whether saturated or unsaturated steam were the better.

On the point as to spiral chutes in coke bunkers, Mr. Halkett said that at Sheffield these were considered carefully many years ago, but the difficulties of fitting anything of this nature which would be satisfactory, and the loss of storage capacity which they would entail, resulted in a decision that they were hardly worth the expense. Also, breakage of the coke was not so vital in their case, since their smaller grades of coke realized higher prices. He would be interested to hear what was the loss of storage capacity by fitting spiral chutes, as experienced by Mr. Newham.

Finally, in regard to carburetting of water gas, Mr. Halkett had found the apparent increase in carburetting efficiency a matter of interest, but what was the design of the original spray, and did this actually distribute the oil evenly over the area of the carburettor? The total areas over which it was possible for the new sprays to distribute oil, he remarked, were evidently much smaller, and the higher efficiency was therefore somewhat difficult to understand. If four smaller sprays were fitted instead of only two, would not still better results be forthcoming?

Mr. NEWHAM, replying, said it was quite probable that coal stacked in the open, if under favourable conditions, would have a lower average temperature than coal stacked in buildings. Should an increase in temperature of coal stacked in the open take place, it invariably commenced on the windward side. A study of the aerodynamics of objects exposed to air-flow might give precise reasons for this phenomenon. In regard to Mr. Halkett's experience of water sprays cracking the bottom castings in the elimination of coke dust during discharge, Mr. Newham said he had not experienced that trouble. Perhaps this was because the water was heated by the steam before entering the receptacles, and thus the temperature change of the castings was not so great as when using only cold water. In answer to the question of storage loss by fitting spiral chutes in coke bunkers, the amount of space taken up by the spirals, said Mr. Newham, would depend on the design of spirals employed. The single spiral type, as installed at the Meadow Lane Works at Leeds, accounted for approximately 15% of the bunker capacity in which the spirals were erected. Had the design of screening plant been such as to allow the spirals to come close up to the screens, the loss in bunker capacity would have been considerably less than that figure.

Oil Spraying.

With regard to the spraying of oil into the carburettor, Mr. Newham agreed that four sprays might be used to advantage, since the sprays could be made of smaller calibre. Examination of the chequer bricks of the carburettor after oil sprays showed no black spots due to cooling by oil contact. It would seem that the oil, being sprayed in such a very fine form, was distributed over most of the brickwork by the turbulence of the gases, and the question of the area covered by the oil spray was reduced in importance. In answer to the final question as to type of nozzle, this, concluded Mr. Newham, was a simple brass nozzle with hole bored through to take a half-inch pipe.

Mr. G. E. CURRIER (Engineer and General Manager to the Bradford Corporation Gas Department) said coal stacking was an important matter, though one was glad to feel there had been no need to resort to the stacks for some time. Quite recently, said Mr. Currier, he had had occasion to go into the matter of the cost of coal stacks, and it was surprising how high this was. There was the cost of putting coal in, the cost of taking out, the cost of depreciation of the coal, and the interest on dead money; and when one came to look deeply into the matter it was really quite an alarming item. One could not be too careful in keeping in mind two important factors—the cost of putting down a coal of gas-making capacity and the cost of the coal's particular capacity for depreciation. In regard to spraying, Mr. Currier said from his own experience he could corroborate Mr. Newham's statements as to the increased efficiency obtained by that type of spray. In his (Mr. Currier's) case they were using three sprays of that type. In regard to coke spirals, he felt that in most new coke-handling plants now being installed they would find these were becoming standardized and the installation was worth while to eliminate breakage.

Mr. C. W. WARD (General Manager, Wakefield Gaslight Company) asked whether Mr. Newham had formed any precise opinion as to the rate of depreciation in stacked coal, and as to whether there came a certain point at which depreciation remained static?

Mr. NEWHAM regretted he had no actual figures on that matter. Depreciation might possibly amount to 20% after several years, but, of course, a great deal depended on the class of fuel and the place of stacking. It was to be assumed that as a general rule outside storage would be subject to higher depreciation than inside. Probably 10% was a low figure, but 10% to 15% might be a general figure.

Mr. CURRIER: The stacks to which I referred are all outside, and the depreciation I find varies from 10% to 20%, according to class of coal.

Mr. A. W. ELLIOTT (Elland), speaking of steaming, thought it good practice to make full use of the sprays. He did not think there was any loss of efficiency in using wet steam rather than dry. In regard to the waste heat boiler, he presumed the feed pipe was as usual, and it occurred to him that the leakage might be due to some over-heating on the tube while the boiler was actually at work, rather than to contraction while the boiler was shut down. He would be interested to know if the water gas plant was of the back-run type.

Mr. NEWHAM said the sprays were put in to quench the dust in the first place, but were now regarded in addition as a medium of steam-raising for the production of blue water gas in the vertical retorts. By using this method, the steam was generated at about one-tenth the cost of steam produced in the ordinary way. Regarding the waste heat boiler, the feed pipe entered about one-third the way along the boiler and turned toward the outlet end. He did not think they could really consider the leakage due to local heating. In answer to the question as to the water gas plant, this was of the old type with no back run. If the old type were adapted to the back run method, he saw no reason why there should be any reduction in efficiency.

Mr. V. J. J. SIDDONS (Barnsley) enquired to which particular system of vertical retorts the waste heat boiler had been attached. Presumably the same class of water was in use, and one would conclude all boilers would be similarly affected by that scale formation unless there was some particular fault in the one concerned. Was there perhaps some fault from expanding the tube or from the material used?

Mr. NEWHAM said there was only one boiler of this type, and this was the only experience he had known in which this trouble happened. The class of water was only 2·8° hardness. The treatment they gave was just by adding about 25 lbs. of common soda per 10,000 gallons of water. They kept the sulphate-carbonate ratio just below ten to one. He hardly thought they could lay this particular trouble down to any fault except scale formation. Apart from that they had no trouble whatever.

Mr. SIDDONS: That proves the decided advantage of water treatment first.

Mr. F. MURPHY (Barnsley) proposed hearty thanks to Mr. Newham for his Paper.

Mr. L. R. COWLEY (Shipley), seconding, said he had experienced somewhat similar conditions of leakage in the waste heat boiler to those mentioned by Mr. Newham, and similar precautions had been taken, though they at Shipley had not gone the length of a continuous blow-down. Mr. Cowley felt the matter of local cooling to which waste heat boilers were subjected was one which might well receive more attention.

A Silver Jubilee Catalogue

"Governor-General" Gas Cookers.

The Silver Jubilee Year catalogue published by General Gas Appliances, Ltd., Audenshaw, Manchester, is an artistic and practical production which proclaims the advantages of the "Governor-General" range of cookers largely with pictorial aid. The centre page, giving examples of the various porcelain enamel finishes, at an extra cost to the mottled enamel list prices, is particularly attractive.

The "Governor-General" cooker marks a striking advance in the design of the single burner oven. By its ingenious method of construction, the patent bottom flue compels the heat to circulate throughout the entire oven, giving a good heat distribution before it leaves the oven and takes its natural course up a patent flue in the door, over the dome of the cooker and out through the flue outlet at the top of the oven. The "Auto-Heat" regulator is an outstanding feature of this range of cookers. All taps are of the "safety" type, being either protected or having a locking device to guard against accidental turning on.

The catalogue is enclosed in silver covers embossed with a purple design.

The New "Cannon" List

Some splendid suggestions for modern kitchens are provided by the new season's gas cooker list recently prepared by the Cannon Iron Foundries, Ltd., Deepfields, near Bilston, who have succeeded in giving the publication more than ordinary sales appeal.

A special feature of the "Cannon" cooker is the "Autimo" oven heat controller which automatically regulates the exact amount of heat required for any cooking operation. This thermostatic control is fitted to the whole range of cookers at an extra charge. Particularly attractive models are the "Champion," which, finished in green, primrose, and cream enamel, embodies certain novel features in oven construction; the "New Challenge," finished identically, is highly efficient in use and economical in gas consumption; and the "Suburban" is a high-grade cooker with specially constructed bottom flue oven which ensures high efficiency and eliminates condensation.

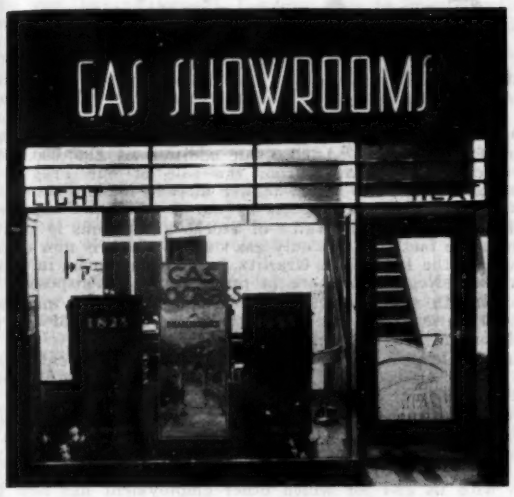
Other appliances described in the list include hotplates, grillers, hot closets, gas ranges, wash boilers, and gas irons. A separate booklet entitled "Champion Autimo-Controlled Gas Cookers" gives colourful and artistic examples of the various finishes in which these cookers can be obtained.

New District Showrooms

for the

Harrogate Gas Company

New Showrooms and Offices for the Harrogate Gas Company were officially opened at Knaresborough on April 16 by Lady Evelyn Collins, O.B.E., J.P., Chairman of the Knaresborough U.D.C., who unlocked the door with a gilt key presented to her by the Chairman of the Company, Mr. Francis Barber.



The exterior of the new Knaresborough Showrooms illuminated at night.

The opening of the new premises was followed by tea at the Elephant and Castle Hotel. In addition to Lady Evelyn Collins and Mr. Barber, the Company included Mr. C. Bateman (Engineer and General Manager of the Gas Company), Mr. A. I. Seaton (Secretary), Mr. H. Wadsworth (Distribution Superintendent), Mrs. Williamson (President of the Harrogate Women's Gas Development Association), together with local councillors and officers.

Mr. BARBER, in moving a vote of thanks to Lady Evelyn Collins for opening the showrooms, said that the Knaresborough portion of the gas undertaking was senior to the Harrogate section by 23 years. Knaresborough was among the earliest communities in the West Riding to use gas for lighting, having obtained its powers to do so in 1823. The Undertaking was purchased by the Local Commissioners in 1846 and later taken over by the Urban Council. It was purchased by the Harrogate Gas Company in 1928. Since the amalgamation, the price of gas in Knaresborough had been reduced by 2d. per therm, or 20%.

Lady EVELYN COLLINS, in responding, referred to the great strides the Harrogate Gas Company has been able to make in the provision of up-to-date appliances. The new showroom should prove of inestimable value to the town in making the latest appliances for lighting and heating more readily accessible, and she hoped the enterprise shown by the Company would be amply rewarded.

The New Premises.

The new showrooms were installed by Messrs. Sharp & Law, of Bradford. They have an attractive modern façade carried out in black opal glass and chromium plate. The illuminated fascia is a special feature of the front, this being glazed with British polished plate enamelled black on the inside.

The letters are engraved and sand-blasted into the plate glass and treated with a special translucent colouring to give luminosity.

The fascia is illuminated at night from the inside producing a brilliant neon effect.

To illuminate the words " Gas Showrooms " and also at one and the same time and with no additional burners to assist in lighting the window below, a box sign consisting of a top and back only was made by Messrs. Foster & Pullen, Ltd. Along the top is an inverted trough-shaped duct to carry away the products of combustion, which, where it leaves the sign proper, becomes round in section for connecting to the flue. This is done by means of a sleeve joint which slides on to permit of easy removal.

The top and back are constructed of 18 gauge cold rolled copper sheet, provided with angle irons running the full length bolted to the top some inches apart, which in turn are connected to rods fastened to the roof. By this means the lamp is suspended in the correct position.

Brass bars having rebates are attached at intervals at right-angles to the window, and these enable sheets of heat-resisting glass to be fitted vertically, thus keeping the direct heat rays of the burners from the window sign proper. The bottom of the sign being open, these same burners project their light downwards through the spaces left by the bars and so light the window.

Provision is made for a current of cold air to pass up each side of the heat-resisting glass to assist in cooling the back of the sign, and doors are provided so that the burners may be easily maintained. A burner is provided for each letter and these project through the back of the case, leaving the primary air and gas adjustments outside. The whole series are connected to a rail which in turn is fitted to a clock controller. By-passes are provided to each burner. The sign can be left alight when the showroom is closed and will extinguish at a predetermined time. Each of the burners is provided with a stainless steel back reflector to assist in more even diffusion of the light rays.

The ground floor comprises a showroom and office. An ebonized counter relieved by stainless steel decorative bands stands out against primrose walls and a polished oak floor. A High Beam " Inlae " gas fire in stainless steel is installed in a black armoured opal surround with stainless steel plinth and two black wooden shelves with stainless steel nosings.

Water Heating Display.

The space behind the counter is equipped as an office for the clerk in charge.

The first floor is equipped entirely as a showroom for demonstrating hot water appliances and the display of fires and lighting fittings. All lights are controlled by wall switches. The fires in the fixtures have automatic lighting arrangement operated by turning the gas tap.

Imperial Continental Gas Association

Annual Meeting

The One Hundred and Eighty-Seventh Ordinary General Meeting of the Imperial Continental Gas Association was held in the Cambridge Room, Great Eastern Hotel, Bishopsgate, London, E.C., on Friday, May 31, 1935, at 2.15 p.m., Sir THOMAS ROYDEN, Bt., C.H. (Chairman of the Association), presiding.

The SECRETARY (Mr. W. E. Bowers) read the notice convening the meeting, and the Auditors' certificate to the Balance-Sheet.

The CHAIRMAN: The Directors' Report and the Accounts, as printed, are in your hands, and I take it that it is your pleasure that they be taken as read.

(This was agreed to.)

The CHAIRMAN said:

My Lords, Ladies and Gentlemen,

Before I deal with the Report and Accounts for the past year I desire to make reference to the great loss sustained by the Association through the death of Monsieur Périer, which occurred with tragic suddenness on May 10. Monsieur Périer joined the Brussels Office just twenty-five years ago. At that time the Electricity Service was in its infancy, and its rapid progress can be ascribed very largely to his appreciation of its great potentialities. In 1921 he was appointed Assistant Manager, and in 1931 he became the Chief Executive Officer in Belgium. The high ability, great tact, and unlimited enthusiasm which he brought to the discharge of the many tasks he had to undertake enabled him to render services of the greatest value to the Association.

Before dealing with the Accounts now in your hands, I would remind you that the trading year of most of our Subsidiaries closed on Dec. 31, and that of the Association on March 31. The official devaluation of the Belga was announced on April 1 of this year, and although this was preceded by a weakening tendency in the Belga exchange rate towards the end of March, the Accounts before you do not reflect the effect of that devaluation.

I will now ask you to turn to the Balance-Sheet, which we have endeavoured to set out in a clearer form by grouping the various categories of assets and liabilities. Taking first the right-hand side, you will see that the Fixed Assets have decreased from £638,000 to £248,000. This shinkage is due principally to the sale during the year of our Prague and Flushing Stations. Now although these two undertakings represented a relatively small part of our total assets, I will ask your indulgence while I explain in detail what has taken place in regard to them.

The Town of Prague owns its own Municipal gas undertaking, and our Association was supplying gas in the adjacent suburbs, in most cases in competition with the Municipal gas undertaking. It is obviously uncommercial to have two undertakings of this kind, each with its separate system of mains in the same streets. A double investment of capital is necessary where one would suffice, and in addition it often involves a double performance of that never popular operation of opening up the streets. After many years of negotiation we have come to an arrangement to cede our Prague Station to the Municipality. The City Council made a hard bargain with us, but I should like to pay a tribute to the good spirit in which the Town of Prague carried on those negotiations. The Town has agreed to take over all our pensions and to treat the years of service rendered by out present employees as if they had been rendered direct to the Municipal undertaking.

In the case of Flushing and the Island of Walcheren generally, our contract was due to expire this year. The Town had the option of taking over our undertaking itself at a valuation, but in the event of it not doing so the Association had the right to continue the exploitation on the same terms as those offered by the most favourable competitor. Despite the fact that since the Association acquired the undertaking from the Town of Flushing it has operated it without complaint or criticism for a period of fifty-four years, the Town authorities not only did not renew our concession, but they made use of a trick to compel us to accept the very low price at which they offered to take over our undertaking. Had we declined their offer, the Association would have been left with a gas plant and a system of mains on its hands without any right to supply gas. Furthermore, they refused to make any arrangement for our pensioners, and have even instigated our former employees to bring lawsuits against us in respect of alleged accrued pension rights, no matter how short was their period of service. This treatment of British interests stands in the more unfavourable light when it is contrasted with the right and reasonable attitude of the Town of Prague.

Investments in Subsidiaries and Allied Companies show a decrease of £115,000 this year, which is mainly the result of certain internal and purely domestic readjustments.

In the case of our Belgian investments, since the devaluation of the Belga there has been a proportionate increase in their currency value, although had the reverse been the case there is a hidden reserve in the book value of our holdings which should be more than sufficient to cover any possible shinkage in capital values.

Advances show a reduction from £693,000 to £568,000, which is the result of our policy in times of currency uncertainties of holding a larger proportion of our liquid resources in sterling.

Our total current assets have over the year increased in value from £1,746,000 to £2,143,000, an addition of £397,000. This increase accrues mainly from the sale of our Prague and Flushing Stations, to which I have already made allusion, and to the repayment of advances by our Associated Companies.

The reduction in the value of Stocks at Stations is attributable to the fact that the only gas station which is now directly owned by the I.C.G.A. is Graslitz, a small enterprise in Czecho-Slovakia. Negotiations are in progress for its disposal.

Sundry Debtors and Items in Suspense show an increase of £96,000, largely due to the outstanding balance of the proceeds of the Prague sale.

British Government Securities and other Investments are up by nearly £100,000 and are, as you will observe, taken at cost or under.

On the other side of the Balance-Sheet, amounts owing to Subsidiary and Allied Companies show a reduction of £83,000. This decrease is attributable to the fact that during the year we have repaid to one of our Subsidiaries cash which was on loan with us and for which other employment has now been found by the lending company.

The reduction of £154,000 in General and Specific Reserves is mainly due to the utilization of the amortization reserve set up against the assets of the Flushing and Prague Stations.

Before we turn to the Profit and Loss Account, it is interesting at this stage to review—in very general terms—the tendencies of our business during the last few years as shown by the figures before you and those of, say, the corresponding Balance-Sheet for 1932. Compared with that year, our directly-owned properties have decreased in value from £969,000 to £248,000, a difference of £721,000, and Advances to our Allied Companies have fallen from £1,470,000 to £568,000, a shrinkage of £902,000, making for these two items a total reduction of £1,623,000, or if we allow for the increase on balance of £37,000 in investments in Subsidiary and Allied Companies of £1,586,000.

On the other hand, Current Assets, less Creditors, have increased over that period by £954,000. I omit from this calculation the capital appreciation, over and above their book value, that exists on our Home Investments.

This increase in our liquid resources is in large measure due to the fact that during the last three years we have sold our investment in the Berlin Electricity Company and our Works at Flushing and Prague; we have received a part repayment of capital from the French Compagnie Continentale; a small portion of our advances to our Subsidiaries has been reimbursed in cash, and profits have been made upon the change of investments. These items together have brought in £1,416,000. On the other hand, the discharge of obligations to our Subsidiaries and new investments have absorbed a cash sum of £462,000, leaving a net increase in liquid assets of £954,000.

The difference between £1,586,000 and £954,000—*i.e.*, £632,000—is reflected almost entirely in the reduction in our Reserves, but this reduction is more apparent than real, inasmuch as it results from the settlement of outstanding obligations to certain of the Subsidiary Companies which were of a capital nature and have been met by us partly in cash, as I have already mentioned, and partly by the transfer of assets. The position of these Subsidiaries, therefore, owing to these transactions, correspondingly stronger, but we have not written up on this account the values at which they stand in the Books.

You will have gathered from my previous remarks that notwithstanding the sale of our Berlin Electricity shares, the Balance-Sheet value of our investments in Subsidiary and Allied Companies has gone up by £37,000 over the last three years. This is accounted for partly by cash investments in new enterprises and partly by the capitalization of our advances to our operating Companies and the transfer from us to them of certain fixed assets which fell geographically into their respective spheres of operation.

Our Balance-Sheet, which is conservatively framed, has been considerably strengthened as the result of these changes. We have cut down our commitments in countries where the political or economic situation was uncertain, we have greatly strengthened the Companies in which we have retained an interest, and we have added very largely to our home balances. Naturally, the contraction of our basis of operation practically to two countries give us much food for thought, but in the meanwhile our money is not idle, and when suitable new opportunities for investment in Utilities present themselves we have in hand the necessary liquid resources to accept them.

Turning now to the Profit and Loss Account, you will see that Net Revenue from Stations, for reasons which I have explained, shows a reduction of £18,000, while our dividend income remains approximately stationary.

On the other side of the Account, our expenses are down by £27,000, owing largely to the reduction in the rate of Income Tax from 5s. to 4s. 6d.

The net result is a profit of £523,000, or £9,000 more than last year, which enables us to recommend a final dividend of

%, and to increase our Carry Forward from £486,000 to £488,000.

That concludes my remarks regarding the actual accounts before you, but you would, I know, wish to hear something of what our Subsidiary Companies are doing and their prospects for the current year.

Those of you who have had time to study the details of our various Subsidiaries, which are attached to the Report, will have probably come to the conclusion that in spite of a very difficult year these Companies have done well. Despite the depressed state of trade in France and Belgium and the resultant unemployment, our sales of gas in 1934 show only a very trifling decrease, while our sales of electricity have increased by 5·4%, compared with 1933. There has been a steady expansion in the number of consumers both of gas and of electricity, but owing to the hard times through which we have been passing, the consumption per head has been relatively less this year.

Much good work of a consolidation order has, however, been achieved. Our rights to distribute gas and electricity are based upon terminable concessions of a maximum length of about forty years. Hence they are in a sense wasting assets, which have to be amortized by the date of expiration of our concessions, and consequently each time a renewal of a contract is secured, the charge for amortization can be spread over a longer period and the free profit is increased. The Antwerp Gas Company and Electrogaz have been successful in renewing gas and electricity contracts, for further periods of approximately thirty years, upon a system of profit sharing with the Communes. Under this system the Communes become our partners, with representation on the Boards of the operating Companies and a real interest in their prosperity. Thanks to this prolongation of the period of our concessions, we are able to find their share of the profits for the Communes out of the amortization which is set free, so that although the gross profits of a company like Electrogaz may, when the adjustment is complete, show a decrease, on the other hand the net profit will be benefited by the lower charge for amortization, and we anticipate that the Companies affected will be able to maintain the payment of their old rates of dividend. Moreover, we now have as partners in our various undertakings in Belgium the Communes in which we operate, which in the opinion of your Board introduces a strong element of future stability and good feeling as between the various Companies and those they serve.

The Cokeries du Brabant had an unsatisfactory year through causes beyond its control, but I trust that, in consequence of the devaluation of the Belga, results for the current year will show a marked improvement. I explained to you in some detail last year how seriously this Company was affected by the depreciation of sterling. During 1934 there was a loss of £73,000. For that loss full provision has been made in the Accounts of Contibel, but for which Contibel would have been able to pay us a dividend of approximately that amount. The Cokeries du Brabant is selling its products for the most part in terms of sterling, and in consequence its sterling receipts should, as a result of devaluation, yield a proportionately larger sum in francs. Provided there is no parallel increase in costs, we should now be within measurable distance of eliminating the loss of that Company, if not, indeed, of making a profit.

In France, the Compagnie Continentale du Gaz has continued to make satisfactory progress.

During the year under review we took up a substantial participation in the Compagnie Industrielle d'Eclairage, which has also fairly wide gas interests in France.

I need not go in further detail into the position of the other Companies in which we are interested, but you will feel assured that we are pursuing our usual policy of conservative management when I tell you that in the period under review the amounts placed to Amortization and other Reserves in respect of our holdings in our French and Belgian Subsidiary and Allied Companies, after deducting the loss sustained by the Cokeries du Brabant were as follows:—

In respect of our French interests, French Francs 19,000,000 as against French Francs 19,600,000 in the previous year, and in respect of our Belgian interests, Belgian Francs 38,327,000, as against Belgian Francs 36,818,000.

These reserves are not remitted to this country, and too much importance should not be attached to the sterling equivalent, the computation of which varies with the rate of exchange.

You must, however, remember that to a certain extent rates of exchange and gas and electricity tariffs do tend to move in line with one another. If the franc appreciates, the cost of living tends to fall, our gas and electricity tariffs follow suit automatically, and our receipts and our profits are smaller. Also an appreciating franc tends to discourage exports and encourage imports, so leading to a reduction of industrial activity, and thus limiting our trading opportunities. A moderate scale of devaluation tends to correct these tendencies.

The reserves which the Subsidiary Companies build up represent profits which they think it advisable to accumulate for the purpose of amortization, &c. The funds so accumulated are utilized either to finance extensions of plant, or to repay advances which have already been obtained for this purpose. It is a happy circumstance that at a time when our Subsidiaries are in a position to reduce the sums placed to amortization, they have reached a point when most of their major extensions of plant have been carried out, so that they should be able to finance out of their own resources their ordinary capital requirements.

Before concluding, I should like to make a few remarks upon the prospects for the current year.

Perhaps the most important factor is the effect on our profits of actual or possible large variations in rates of exchange. In the case of the Belga, the average rate at which the dividends of the Belgian Companies were remitted during 1934 was Frs. 108 per £; the new rate will be in the neighbourhood of Frs. 143 to the £.

The future of the franc in France is problematical, but should some measure of devaluation be decided upon, we shall be faced there, as we are now faced in Belgium, with the fact that there would be a falling off in the sterling value of our dividends proportionate to the rate of devaluation.

Our primary interest, however, is not one of exchange, but one of trade, and, as I said last year, it is our hope and belief that exchange adjustments in the Gold Bloc countries will prove a stimulus to trade and will lead to an increased demand for gas and electricity, and that in consequence, results of operation will show an improvement sufficient, or more than sufficient, to compensate us for the change in the relative values of the franc and the pound sterling.

In the meantime, and during this period of uncertainty, your Board has felt that, seeing that this is an English Company whose dividends are payable in sterling, the right course was to take such measures as were possible to ensure that the remittance of our foreign earnings should be at the rate of exchange obtaining as those earnings accrued. Our policy, therefore, has been to avoid what otherwise would have been a gamble in the rates of exchange ruling on the date when the dividends of our Subsidiaries were due for remittance, and so, as profits were earned which we knew would ultimately be translated into dividend payments, we covered our exchange forward. We considered, moreover, that in all probability, if and when devaluation took place, the period of readjustment would require at least six months to become effective, and that during this time profits might fail to expand in the same proportion as the rate of exchange depreciated. Consequently a second set of, shall I say, protective exchange operations became necessary to cover the period of readjustment. In the case of our French profits, we have followed a consistent policy of covering these as they accrue; hence in the present difficult times no panic measures have been necessary. The Belgian profits for the first nine months of the current trading year are covered forward at the pre-devaluation rate, leaving only three months to be brought into account at the post-devaluation rate.

We trust that by the time the last quarter of the year is reached, trade will have recovered to an extent such that increased earnings will compensate for the less favourable remittance rate. So far there is not a great deal of evidence upon which to base any conclusion. The cost of living in Belgium, for example, instead of continuing to fall, has, since devaluation took place, risen slightly. This is of importance to us, as many of our tariffs and our wage scales, are based upon the cost of living index. Unemployment has diminished and trade generally has improved. Our output of electric current in Belgium, for instance, for the month of April shows an increase of 13%, which compares favourably with an average rate of increase of 5·4% in 1934. Whether this improvement will be maintained, it is difficult to forecast.

In most of our contracts we have a gold clause, a clause which enables us to revalue our capital according to the movement in the wholesale and retail index figures. Public Utility Companies are in the position of being servants of the public, and we should, I think, be false to our trust if, in anticipation of a general upward movement in the cost of living, we endeavoured immediately to raise our gas and electricity prices. We must be prepared, whatever our contractual position may be, to follow in the wake of such a movement and not seek to anticipate it. In fact, I would gladly see all our tariffs remain at their present levels, provided a proportionate increase of output was the result. Gas and electricity have to meet fierce competition from alternative means of producing heat, light, and power, and if our prices do not rise we may be enabled to capture some of the business which in the meantime has gone elsewhere.

Since our last meeting two changes have taken place in the composition of the Board of the Association.

As all of you are doubtless aware, our eminent colleague, Monsieur Georges Theunis, became in November last Prime Minister of Belgium, and in those circumstances tendered to us his resignation. He has now laid down his office, and we sincerely hope that the time is not far distant when he will rejoin us, so that we may once again have the advantage of his wise counsel.

Secondly, we have elected to our Board Sir Francis Lindley, who has had a distinguished career in the Diplomatic Service. I feel sure that we shall find in him a valuable collaborator, and I have great pleasure in asking you to confirm his election, for which a Resolution will be submitted to you in due course.

Before I move the necessary Resolutions giving effect to our recommendations, I have great pleasure in paying a tribute to the very excellent work of all the members of our Staff and of the Staffs of the Companies abroad in which we are interested. The labours of your Board are immensely helped by the invaluable services rendered by our Manager Director, Mr. James. Mr. James has been associated with our Company for sixteen years, and during that time he has acquired an intimate knowledge of the detailed working and the many ramifications of our business here and abroad. His work is one that requires in very large measure not only a close grip of the commercial and technical sides of our enterprise, but also the

ability to deal successfully with the day-to-day problems which are constantly presenting themselves. His energy knows no limits, and he possesses tact and personality that combine to make him a most admirable Head of our Executive.

In France we are most fortunate in having in the person of Monsieur de Richemont a Managing Director of outstanding ability. He applies himself to the management of the affairs of his Company in a manner which must be a source of inspiration to all his staff. We, as the most important shareholder in the Compagnie Continentale du Gaz, owe him a very real debt of thanks, and I should like to send to him from this Meeting an expression of our appreciation of his efforts to maintain the profits and the prestige of that Company in times which have been the reverse of easy.

Although I have especially mentioned Mr. James and Monsieur de Richemont, I should like to include in my words of appreciation our various other Managers, and I would ask them to accept for themselves and to transmit to the other members of their organizations a message of our real appreciation for the loyalty, efficiency, and zeal which they display in carrying out their respective duties.

I now move that the Report of the Directors and the Audited Statement of Accounts for the twelve months ended March 31, 1935, already printed and circulated among the proprietors, be adopted, and that a Final Ordinary Dividend on the £5,600,000 Capital Stock be paid on June 1, 1935, for the year ended March 31, 1935, to proprietors registered in the Books at the close of business on May 15, 1935, at the rate of 7% (actual), less income-tax at 4s. 6d. in the £, making, with the Interim Dividend of 5% (actual), less income-tax, paid on Nov. 15, 1934, a dividend at the rate of 12%, less tax, for the year.

Sir HENRY BIRCHENOUGH, Bt., G.C.M.G.: I have great pleasure in seconding the resolution you have heard read by the Chairman.

The CHAIRMAN: Before I put the resolution, I would ask if any stockholders desire to make any comments on the Report and Accounts or to ask questions. If so, this is the moment for them to do so.

A question put by a Proprietor having been answered, the resolution was carried unanimously.

Re-Election of Directors.

The CHAIRMAN: I now beg to move that Sir George Jesse Bt., M.C., and Sir John R. Chancellor, G.C.M.G., G.C.V.O. D.S.O., who retire from the Board, be re-elected Directors of the Association.

Sir GUY FLEETWOOD WILSON, G.C.I.E., K.C.B., K.C.M.G.: beg to second the motion.

(The motion was carried.)

The CHAIRMAN: As provided by the Articles, the election of Sir Francis Lindley to the Board must be confirmed by the stockholders. I formally move that the election to the Board of the Rt. Hon. Sir Francis Lindley, G.C.M.G., C.B., C.B.E. be and is hereby confirmed.

Sir HENRY BIRCHENOUGH, Bt., G.C.M.G.: I second with great pleasure the resolution to confirm the election of Sir Francis Lindley.

(The resolution was carried unanimously.)

Re-Election of Auditors.

Mr. A. C. WHITMEE (a Proprietor): I beg to move that the firm of Messrs. George A. Touche & Co., of Basildon House, 7-11, Moorgate, London, Chartered Accountants, be appointed Auditors for the ensuing year at a fee of Two Hundred and Fifty Guineas.

Mr. B. W. BLOOMER (a Proprietor): I have pleasure in seconding.

(The motion was carried.)

The CHAIRMAN: That, ladies and gentlemen, is all the business before us. It remains for me to thank you very much for your attendance.

(The meeting then closed.)

Parkinson & Cowan

Ordinary General Meeting

The thirty-fifth ordinary general meeting of Parkinson & Cowan, Ltd., was held on May 31 at Terminal House, Grosvenor Gardens, S.W., Lieut.-Colonel H. W. WOODALL, C.I.E., M.Inst. C.E. (Chairman and Managing Director), presiding.

The SECRETARY (Mr. A. Gordon, F.I.S.A.) having read the notice convening the meeting and the report of the auditors,

The CHAIRMAN, having dealt with items in the balance-sheet, said: Turning to the profit and loss account, I may remind you that as a holding Company our income chiefly consists of contributions from subsidiary companies in the shape of dividends. This account would have shown to greater advantage this year had it not been that profits made by one important subsidiary have had to be set against losses made by it in previous years. As a result, however, of improved results the adverse balance has now been liquidated and it has been possible to augment the reserve fund as explained in the Directors' report and amplified in my previous remarks.

The account has been further affected by the fact that another subsidiary which had previously contributed substantially to our dividend fund earned less in 1934. Although sales of units were materially higher the percentage of profit was lower, due to a variation in the type of apparatus required. We have reason to believe that this is only a passing phase and that in the coming year there will be a return towards more normal conditions.

Period of Transition.

The past few years have been particularly difficult, not only by reason of our diverse and widely scattered interests, but also on account of the period of transition through which we have been passing.

To bring our products up to modern requirements has involved an immense amount of work, but results are beginning to show as evidenced by the increasing demands for our goods.

Throughout the whole of our organization sales of units have increased, and though, for reasons mentioned above, this has not been reflected to the same extent in cash receipts, sales turnover has increased throughout the group.

In our stove business there have been considerable developments during the year. Till recently there have been three distinct schools of gas cooker design—the British, the American, and the Continental. Climate, local architecture, food, fuel available, scale of income, all have their effect, and the Gas Industry of this country is rather at the parting of the ways as regards what the gas cookers and fires of the future are to be. We are watching the position very carefully and the work and effort expended by our staff have not been without their reward.

The two principal events of the year so far as this branch of the Gas Industry is concerned have probably been the Exhibition of Art in Industry at the Royal Academy and the replica of the King's House shown at the Ideal Home Exhibition at Olympia.

Gas Cooker Success.

One of the chief attractions of the former was a modern kitchen. This was designed by Mrs. d'Arcy Braddell and naturally promoted keen competition between the various suppliers of domestic cooking appliances for representation under conditions of such importance. In making their selection of cooking apparatus, the Committee of Architects decided in favour of the Parkinson gas cooker, designed by us in conjunction with the Research Department of the Gas Light and Coke Company and produced at our Stechford Works.

We do not wish to put forward exaggerated claims of any sort, but when I tell you that a practically similar Parkinson gas cooker has been adopted for use in the King's House and was exhibited in the replica at Olympia, I think it will be agreed that our Research Department, under the able direction of Mr. Rogers, has not only secured a triumph for the Parkinson Stove Company but has enabled us to make a noteworthy contribution to the advance and consolidation of what is at present one of the most important markets of the Gas Industry.

Modern interior architectural development has been towards straight lines and flat surfaces and we are producing gas fires to comply with these requirements. At the same time, we are satisfied that a demand exists for the greater comfort of the wide distribution of heat afforded by our "Curvex" type of gas fire. This fire is designed on thoroughly scientific lines and we are offering it in new models for the benefit of those who prefer domestic comfort to purely æsthetic considerations.

In order that a very pleasant form of directional radiant heating may be available to gas consumers, we have recently introduced the "Paravex" fire and "Ubic" radiator. This new form of heating is highly efficient and very economical in gas consumption.

We are among the oldest makers of geysers and gas water heaters in the country and with new and improved models, this side of our business is making progress.

Additions to Plant.

During the year considerable additions have been made to our plant and factory capacity and we are now fully equipped to deal with the normal increase of business. In this connection, it may interest you to know that three years ago the percentage of enamel cookers sold by us was 39%, as against 61% black cookers. To-day the percentage of enamel cookers has increased to 81%.

Further factory extensions are in hand which will enable us to undertake business of an important nature with which we have recently been entrusted, the full benefits of which will not, however, be experienced till next year. Our lighting business

also showing promise and it may interest you to know that supplied floodlighting installations to 43 towns in the United ngdom in connection with the King's Jubilee.

Intensive technical effort has been devoted to the meter side our activities, and measures for the co-ordination of our ious factories are being proceeded with and should bear fruit en completed.

Australian Interests.

Our Australian interests have been a source of considerable iety during the year. Sales have increased, but local diffi- ties and the ever-present handicap of adverse exchange have ected profits. So far as practicable the position is met by led charges on goods shipped from England, but this is only ssible to a limited extent, and all remittances are, of course, fected to the full extent of the depreciation. I am, however, d to be able to inform you that the fusion of certain of our erests in Australia, to which I alluded earlier in my remarks, shows great promise, and should prove of advantage to the future of our business.

In the foregoing remarks I have endeavoured to give a brief summary of the present position of the Company. It has never been anticipated that recovery would be a simple or a rapid process, but while I have no desire to prophesy, present indications are distinctly promising in comparison with recent years.

You will see from the report that a half-year's preference dividend is being paid to-day which brings it up to Sept. 30, 1934. In this connection I should perhaps advise you that the expansion of business to which I have alluded has already required considerable financial assistance, and will require more as the year goes on, rendering necessary a careful conservation of our cash resources.

The Chairman concluded by moving the adoption of the report and accounts.

Sir HAROLD E. SNAGGE, K.B.E., seconded the resolution, and it was carried unanimously.

Croydon Co-Partnership Gathering

Thirteenth Annual Meeting

The fact that it was the thirteenth annual meeting of their o-Partnership Scheme appeared to hold no sinister significance r employees of the Croydon Gas Company, judging by the rge and enthusiastic gathering at the North End Hall, Croy- on, on May 28. On the contrary, there seemed to be a greater umber present than usual, and the spirit of enthusiasm which revailed and the cordiality with which the remarks of the arious speakers were received bore ample testimony to the resence of the true spirit of co-partnership—in the real meaning f the term—among those who serve the Croydon Company.

After the customary half-hour of community singing, Mr. WILLIAM CASH, J.P., F.C.A. (Chairman of Directors), rose to ddress the gathering, and in the name of his fellow Directors e offered a very hearty welcome to all those present. As the ears passed, he said, it was found increasingly difficult to pro- ide a variation in the proceedings at their annual gatherings. ut on this occasion he was going to make a change and not eal in detail with the figures in the accounts as he had done n previous years, but merely refer to one or two points as ndicative of the progress of the Company as a whole during the ast twelve months.

Having apologized for the absence of Mr. Charles Hussey, who greatly regretted not being able to be present on that occasion, Mr. Cash went on to say that they had added 4,800 new con- sumers, bringing the total up to more than 94,000—so that it would be seen that they were not now very far short of the hundred thousand mark. They had laid 33 miles of new mains, making a total of 541 miles. These figures could be regarded with satisfaction, as they went to prove that there was a definite need for gas in all the new houses which were being built in and around Croydon. These smaller houses which were being put up and the large number of bigger houses which were being converted into flats led to a smaller average consumption per consumer; but in spite of this they were able to record a small increase in total output of gas. Another reason why there was not a larger increase was that they experienced very mild weather in December compared with that month in the previous year. Up to the end of November they showed an in- crease in output of 2½%. Furthermore, they were putting out appliances which were more economical in their use of gas as a result of continual improvement by the makers. He was sure they would agree that it was a wise policy not to sell extrava- gant appliances. They had in Croydon a very heavy heating load. In addition, the habits of their consumers were changing, and particularly in the summer time there was a tendency to do less cooking at home and rely more upon the tin-opener.

Public Lighting.

The Chairman went on to refer to the question of public lighting, in connection with which the Company had had a good deal of negotiation. There was a tendency in certain quarters to advocate the use of electricity for public lighting; but he would like to say, on behalf of the Gas Industry, that gas could provide just as efficient and economical public light- ing as electricity if only the authorities would tell them what they wanted. It was unfair to compare gas lighting which in the past might have been inadequate through no fault of the Company with up-to-date electrical installations at a much greater cost. He suggested that they were entitled to greater consideration in this respect, having regard to the fact that they employed a considerable amount of local labour and were very large ratepayers.

Competition, he said, was a very serious matter to the Com- pany in a number of directions, not only with electricity itself, but in the stoves and appliances which were being put out by that industry. On the whole their gas sales were fairly level, but when they came into a new district they showed a very sub- stantial increase. In Oxted, for instance, there was an in- crease of not far short of 90%, which was a very good testi- monial to the energy of their officers. Their sales of apparatus last year came to £90,000, and in this connection he wanted to express the thanks of the Board of Directors for all the good work done by those co-partners who came into contact with the consumers on the district. The Company did want the assistance of all of them in meeting competition. Their liveli- hood depended upon the success of their Undertaking. They were affording a public service and as a Company they all had a duty to their consumers—and co-partnership and co-operation in all ranks must inevitably assist in this direction.

In conclusion, Mr. Cash congratulated Mr. P. Richbell, their Distribution Superintendent, upon being awarded the Bronze Medal of The Institution of Gas Engineers last year, while he also referred to the interest which had been displayed in their works by the large number of shareholders who had visited them the previous week, to which reference was made in last week's "JOURNAL."

Taken as Read.

To Mr. WILLIAM CASH, Junr., fell the task, which his father had delegated to him, of submitting the report and accounts for the year, which he most ably performed by treating them as, he observed, most dull items were usually treated—namely, by taking them as read. He did, however, refer to the en- couraging fact that the balance at credit of the Pension, Widows' and Orphans' Fund Account had increased from £365,000 to £402,000, while the total number of co-partners had grown from 995 to 1,048. The Company, he said, was growing, and the Directors and Co-partnership Committee believed it would continue to grow. There was no intention of diminishing their investments, which now showed an appreciation of £66,000, by realization; nor was there any intention of diminishing the number of their employees. The whole report and accounts pointed to steady growth and—what was more important—showed a steady faith in the future of the Company and of its co-partnership scheme. In conclusion, Mr. Cash quoted the remarks of the Archbishop of York, who compared co-partner- ship in industry with a football team, each member of which was competing to be the best player in the team while at the same time everybody was sacrificing any showing-off in order that the whole side might win the match.

Long Service Awards.

After the presentation of a report by Mr. R. RICHARDSON (Secretary of the Co-Partners' Representatives on the Co- Partnership and Works Joint Committee), the CHAIRMAN pre- sented long service awards to the following employees who have completed 25 years with the Company, congratulating all in turn and thanking them for all they had done for the Company during a quarter of a century of service:

A. J. B. Aldridge (Fitter, Sales Department), W. G. Andrews (Sub-Inspector, Sales Department), Miss M. C. Baldwin (Lady Adviser, Sales Department), C. H. E. Brooker (Fitter, Sales Department), L. F. Bundell (Prepayment Collector), A. S. Burt (Prepayment Collector), F. W. Byford (Labourer, Waddon), A. G. Fewell (Fitter, Sales Department), H. J. Hutchings (Carpenter, Waddon), H. W. Kerridge (Coke Re- presentative), H. S. Knight (Prepayment Collector), B. G. Maisey (Foreman, William Cash Workshops), G. E. Neale (Showroom Salesman), F. C. Vanderwerff (Sub-Inspector, Sales Department), J. W. Winfield (Foreman, Sales Department), A. B. Woodhams (High-Pressure Lamp Attendant), and S. H. Wright (Sulphate Makers Assistant, Waddon).

On the proposition of Mr. O. ARNOLD, a vote of thanks was heartily accorded to the Chairman and Directors of the Com- pany for their interest in and support of the Co-Partnership Scheme, to which Mr. CASH briefly responded; and after re- freshments had been served the remainder of the evening was given over to a concert party entertainment.

City and Guilds of London Institute Examinations

The following questions were set in the City and Guilds of London Institute Examinations for 1935 in the subjects named:

MINOR COURSE IN GAS-WORKS PRACTICE.

Tuesday, May 7, 7 to 10 p.m.

(The maximum number of marks obtainable is the same for each question. Not more than six questions to be attempted.)

1. Describe, with the aid of sketches, the apparatus by means of which coke is extracted from any one type of continuous vertical retorts.
2. What conditions of operation may give rise to stoppages in the ascension pipes of a setting of horizontal retorts, and how should such conditions be modified to avoid stoppages?
3. Set out the order and duration of each operation involved in one complete working cycle of a hand-operated carburetted water gas plant of a capacity of 1 million cu.ft. per day, the quality of the gas produced being 500 B.Th.U. per cu.ft. What quantity of gas oil will be required *per cycle*? How often must coke be charged to the generator, and what quantity will be required *per charge*? (Clinkering periods may be ignored in your calculations.)
4. Describe, with the aid of sketches, a waste-heat boiler suitable for raising steam by the use of the waste gases leaving a bench of retorts. What auxiliary machinery or appliances are required to enable the boiler to do its work?
5. What purpose does a seal-pot serve?

Sketch suitable seal-pots for use with

(*a*) A condenser,
(*b*) An ammonia washer,

in each case showing leading dimensions, and the approximate positions of the liquid levels when at work.

6. What types of plant may be used for the conveyance of coke from a retort house to coke screens or to stock?

Mention, briefly, the chief advantages of each type.

7. Describe an instrument used to ascertain the amount, expressed as a volumetric percentage, of carbon dioxide contained in a mixture of gases.

What percentage of carbon dioxide would you expect to find in—

(*a*) Producer gas,
(*b*) Waste gases leaving a bench of retorts,
(*c*) Town gas, having a calorific value of 500 B.Th.U. per cu.ft., produced in vertical retorts?

8. Describe, with the aid of sketches, any one type of station governor and explain its action.

MINOR COURSE IN GAS SUPPLY PRACTICE.

Tuesday, May 7, 7 to 10 p.m.

(The maximum number of marks obtainable is affixed to each question. Not more than six questions to be attempted.)

1. Describe the functions of a gasholder. (*25 marks.*)
2. Describe three types of steel mains. State what kinds of joints you favour, and why. (*25.*)
3. In what position would you attach a 1-in. service pipe to a cast-iron main? Give reasons for your choice of position. (*20.*)
4. Explain in detail the following terms as used in gas meter practice:

(*a*) Capacity per revolution.
(*b*) Passing unregistered gas.
(*c*) Oscillation. (*30.*)

5. Sketch a modern lighting fitting in which the products of combustion are prevented from coming into contact with the fitting. (*30.*)
6. Describe *any one* type of sink water heater. What is a suitable water temperature at the outlet? (*20.*)
7. (*a*) What advantages are claimed for a bottom flue outlet in gas cookers?
   (*b*) Sketch a gas match for attachment to a cooker. (*30.*)
8. What appliance would you fix to a gas engine supply to prevent inconvenience to adjacent consumers? Briefly describe the appliance. (*20.*)

GAS FITTING.

GRADE I.

Friday, May 3, 7 to 10 p.m.

(Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.)

1. What are (*a*) compo pipe and (*b*) malleable iron fittings? Describe briefly the advantages and drawbacks of each when used for gas fitting work.
2. Give full-size sketches of the following pipe fittings:
   (*a*) ¾-in. by ½-in. centre tee piece.
   (*b*) ½-in. by ⅜-in. reducing or diminishing socket.
   (*c*) ½-in. brass elbow.
3. Describe step by step the joining with a blown joint of brass union, or meter cap and lining, into lead pipe. What precautions have to be taken to ensure a neat and sound job?
4. Make a list of the tools and materials required to fix a small meter and shelf to existing capped service and outlet pipe. Assume the wall to be of lath and plaster construction.
5. If the quarterly readings of a meter in any one year were

March	...	64·2,
June	...	82·8,
Sept.	...	91·4,
Dec.	...	1·2,

what would be the consumption in cubic feet and in therms for the June, September, and December quarters, if the gas had a calorific value of 550 B.Th.U. per cu.ft.
6. What is the difference between luminous and bunsen flames, and what are the advantages of each?

Write a short list of the usual domestic appliances and by the side of each show which of the above two types you recommend.

7. Give a sketch plan of the hotplate of a domestic cooking stove of medium size. Number each of the burners on your sketch and give the approximate hourly gas rate of each of them.
8. Which of the three following fittings would you recommend on a rising pipe in a house:

(*a*) a union,
(*b*) a connector,
(*c*) a double connector?

Give reasons for your choice.

9. Describe fully the work of thoroughly cleaning and regulating a gas fire on the district.

GAS FITTING.

GRADE II.—WRITTEN PAPER.

Friday, May 3, 7 to 10 p.m.

(Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.)

1. You are requested to lay a 1½-in. gas supply pipe across a factory ceiling constructed of rolled steel joists with concrete between them. The concrete is arched and the gas supply is to run at right angles to the joists, which are approximately 3 ft. apart. Describe how you would carry out this job and make a list of the tools required. Illustrate your answer with a sketch.
2. What apparatus would you use to record the pressure throughout 24 hours in a building? Describe briefly how it operates.
3. Assume that a meter of 20-light size, or 200 cu.ft. hourly capacity type, is to be fitted on a brick wall of 4½ in. thickness. The service and outlet both drop down to the meter. Show how you would secure the meter shelf to the wall, and how you would make the lead connections to ensure warning being given before possible condensation entered the meter.
4. You are requested to fix six 5-light lamps to operate from a single distant control tap. What size of supply pipe (total length 60 ft.) would you use? What system of control would you recommend? Describe briefly how it operates.
5. What type of radiator is usually fitted in a garage, how does it operate, and what precautions would you adopt when fitting it?

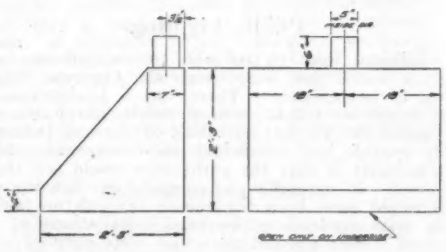


Fig. 1. Question 6.

6. Fig. 1 shows a hood intended to be fitted over a cooking stove. Calculate the number of square feet of sheet metal required to make it (excluding seams) and the weight of the hood, assuming the metal to be of 24 S.W. gauge (·897 lb. per sq.ft.).
7. The hottest water is found at the top of a storage tank or cylinder. Explain why this is so, and show by means of a

...tch how the flow, return, and cold feed pipes should be ...anged to maintain this condition.

8. Explain, step by step, how you would completely overhaul the job *one* of the following types of water heaters and ...cribe the tests that you would apply to ensure satisfactory ...rking:

(*a*) A single point water heater (geyser).
(*b*) A circulating type.
(*c*) A storage heater.

9. Give sectional sketches of, and describe fully, any type efficient flue terminal and baffler. State the purpose for ...ich it is used.

GAS FITTING.

GRADE II.—PRACTICAL EXAMINATION.

(Four hours allowed for this paper. Candidates must attempt all questions.)

The following materials to be supplied to each candidate:

One ½-in. by ¼-in. centre tee piece.
One 10-light meter cap and lining.
One 1-in. lead to barrel union.
Three feet of ½-in. wrought iron or mild steel barrel (tubing).
One ½-in. connector or long screw, not less than 9 in. long.
One ½-in. short piece, not less than 4 in. long.
Four ½-in. elbows.
One ½-in. by ¼-in. centre tee piece.
Three ¼-in. stub nipples (barrel nipples).
One ¼-in. tee piece.
Two ¼-in. teat or flexible tube cocks.
One 2-ft. length of ½-in. polished, well annealed, solid drawn brass tubing.

1. With the material provided, make up a 1-in. diameter ...eter connection to the dimensions shown in fig. 1. Springs ...d bobbins may not be used. (*Time allowed, 1½ hours: 40 ...arks.*)

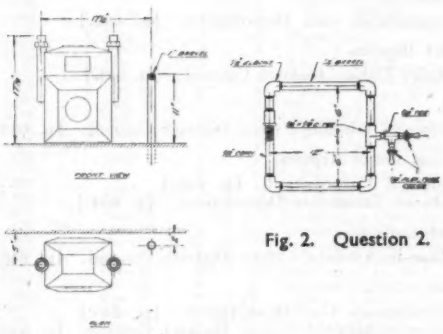


Fig. 1. Question 1.

2. With the material provided, make up the barrel fitting to ...he shape and dimensions given in fig. 2. Test for soundness ...t 3-in. water gauge pressure. (*1¼ hours: 30 marks.*)

3. Set the brass tubing over the section of wood curb provided; connect the gas fire, and regulate for the best results. (*1 hour: 20 marks.*)

4. Adjust the governor to give 2½-in. water gauge pressure; ...ssemble the hotplate of the cooking stove, and regulate the ...burners. (*¼ hour: 10 marks.*)

GAS FITTING.

FINAL.—WRITTEN PAPER.

Friday, May 3, 7 to 10 p.m.

(Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.)

1. An advertising hoarding, approximately 50 ft. long by 9 ft. ...igh, is fixed to a 14-in. wall, 15 ft. high. You are requested ...o run the necessary gas supply pipes and fix 7-light superheated lamps fitted with parabolic shades at 10 ft. centres. The ...amps are to be fitted 4 ft. away from the hoarding.

Make a sketch of the job and show the type of lamp arm and ...upport that you would use.

What system would you adopt for automatic lighting and extinguishing?

2. A meter with screwed top unions has to be fitted in a position where it is impossible to by-pass it across the top. ...how by means of a sketch how you would overcome this difficulty.

Several radiators with thermostatic control depending upon room temperature are to be fitted in a hall. How would you carry out the job? Describe briefly the apparatus that you would use.

4. Assume that when cutting out to insert a tee piece on a ...-in. service in a cellar the service splits along the back which is touching the wall and that the nearest socket is under the footpath. Describe fully how you would deal with the emergency.

5. A central heating system of four radiators is operated by a coke-fired water heater, and a 40-gallon hot water storage tank for domestic purposes is heated by means of a calorifier from the coke system. What type of gas water heater would you recommend to be fitted in order that hot water may be available when the coke system is out of use? Give a line diagram showing the complete installation.

6. Complaints of oscillation have been received from a number of consumers, and the trouble is traced to a gas engine. How might the gas engine cause this oscillation, and what could be done to overcome the trouble?

7. How many therms would be required to heat 300,000 cu.ft. of air from 32° F. to 65° F., using an air heater having an efficiency of 75%. Assume that 0·02 B.Th.U. is required to heat 1 cu.ft. of air through 1° F.

8. In what respects have modern meters been improved to enable larger volumes of gas to be passed without increasing the size of the case?

9. Give a description of various methods of protecting service pipes from corrosion.

GAS FITTING.

FINAL.—PRACTICAL EXAMINATION.

(Four hours allowed for this paper. Candidates must attempt all questions.)

The following materials to be supplied to each candidate:

One 6-ft. length of ¾ in. wrought iron or mild steel tubing (gas weight).
One 3-ft. length of 1¼-in. lead pipe (gas weight).
6 in. of ¾-in. lead pipe.
One 1¼-in. brass union (lead to barrel).
One 20-light meter cap and lining.
One ¾-in. elbow.
One ¾-in. plug.

1. With the material provided, make up a 1¼-in. diameter meter connection to the dimensions shown in fig. 1, and make a ¾-in. saddle joint in any convenient position. (Springs and bobbins may be used.) (*Time allowed 1½ hours: 40 marks.*)

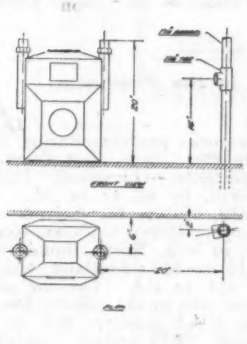


Fig. 1. Question 1.

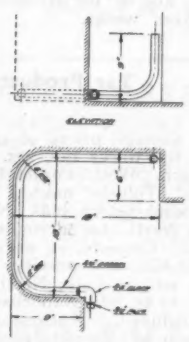


Fig. 2. Question 2.

2. With the aid of the forge, set the length of ¾-in. barrel provided to the shape and dimensions shown in fig. 2. (*1¼ hours: 30 marks.*)

3. With the material provided, fix the Newbridge switch and valve with the necessary cable to the lighting fitting. Adjust for the best results, and answer the questions asked by the Examiner. (*¾-hour: 20 marks.*)

4. Connect the recording pressure register with flexible tube, calibrate, and leave ready for use. (*½ hour: 10 marks.*)

Athletic and Social

London Gas Bowling Association.

The London Gas Bowling Association, which comprises membership from the Gas Light and Coke Company, the South Metropolitan Gas Company, the South Suburban Gas Company, the Tottenham and District Gas Company, the Wandsworth and District Gas Company, and the Croydon Gas Company, held their first match, against the London Business Houses, on the Croydon ground recently.

Forty-eight players were entertained at tea by the Croydon Gas Company's Bowls section, when a few words of welcome were expressed by Mr. W. J. Sandeman (General Manager), who said how proud the Croydon Company were that the Association should have selected their ground for the first match.

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share List, see later page)

Except in the Industrial section, which was strong throughout, markets opened the new Account last week with a feeling of nervousness over the French monetary situation. Gilt-edged stocks were particularly erratic and prices eased. Later, however, the tone generally became much brighter, with the result that in most cases any early set-back was more than recovered and the week closed with firm conditions prevailing in almost all sections.

Gas stocks and shares were unaffected by the general position and continued firm. The volume of business was well up to the average, and several upward price movements were recorded. Malta and Mediterranean headed the list with a rise of 5 to 210-220; North Middlesex recovered 4½ to 165-175; Lea Bridge was marked up 3 to 175-185; British 7% preference rose 2½ to 160-165; while European, after initial weakness, eventually closed higher on the week. The only set-back of note was a fall of 5½ in Imperial Continental to 200-210.

Current Sales of Gas Products

The London Market for Tar Products.

June 3.

There is little of interest to report in the Tar Products market, prices remaining as follows:

Pitch, about 40s. per ton f.o.b., creosote about 5¾d.
Refined tar, 4d. per gallon in bulk at makers' works.
Pure toluole, 2s. 2d. to 2s. 3d.
Pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, 1s. 5d.; and 90/160 pyridine, about 5s. 6d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

June 3.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 25s. Pitch—East Coast, 37s. to 39s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 37s. to 39s.* Toluole, naked, North, 1s. 8d. to 1s. 9d. Coal-tar crude naphtha, in bulk, North, 6¾d. to 7d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 5½d. Heavy naphtha, North, 9¾d. to 10¾d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¾d. to 4⅞d.; low gravity, 4¾d. to 4⅞d.; Scotland, 4¾d. to 4⅞d. Heavy oils, in bulk, North, 4¼d. to 4¾d. Carbolic acid, 60's, 2s. 1d. to 2s. 2d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *June* 1.

There is only moderate activity in this market at present, although, on the whole, prices are well maintained.

Crude gas-works tar.—The actual value is 28s. to 30s. per ton *ex* works in bulk.

Pitch.—Against any export enquiries round 37s. 6d. per ton f.o.b. Glasgow is being quoted, while, in the home market, about 37s. 6d. per ton *ex* works in bulk is obtainable.

Refined tar is now very active and value in this district is 3d. per gallon net and naked at makers' works.

Creosote oil remains firm and demand continues strong. Prices show an appreciation during the week to the following: B.E.S.A. Specification, 5¼d. to 5⅜d. per gallon; low gravity, 5¼d. to 5½d. per gallon; and neutral oil, 5½d. to 5⅝d. per gallon; all f.o.r. in bulk.

Cresylic acid.—Little or no interest is being taken in this, and prices are unstable. Pale, 97/99%, 1s. 1½d. to 1s. 2½d. per gallon; dark, 97/99%, 1s. to 1s. 0½d. per gallon; and pale, 99/100%, 1s. 2½d. to 1s. 3½d. per gallon; all *ex* works naked.

Crude naphtha.—Value is maintained at about 4¼d. to 4¾d. per gallon, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 3d. to 1s. 3½d. per gallon, and 90/190 heavy naphtha is 10d. to 11d. per gallon.

Motor benzole is quoted at 1s. 2½d. to 1s. 3½d. per gallon bulk at makers' works.

Pyridines.—90/160 grade is 5s. 6d. to 6s. per gallon, a 90/140 grade, 6s. to 6s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole the present time:

	s. d.		s. d.	
Crude benzole	0 9½	to	0 10	per gallon at works
Motor ,,	1 3	,,	1 3½	,, ,, ,,
90% ,,	1 4	,,	1 4½	,, ,, ,,
Pure ,,	1 7½	,,	1 8	,, ,, ,,

Contracts Advertised To-Day

Coal.

Atherton Gas Department. [p. 643.]
Haverhill Gas Department. [p. 643.]
Hebden Bridge and Mytholmroyd Gas Board. [p. 644.]
Padiham Gas Department. [p. 644.]
Stoke-on-Trent Gas Department. [p. 644.]
Sutton-in-Ashfield Urban District Council. [p. 643.]

Compressor.

Barnoldswick Gas Department. [p. 646.]

Gasholder Repairs.

Sedgley Urban District Council. [p. 644.]

Mantles.

Sutton-in-Ashfield Urban District Council. [p. 643.]

Meters and Meter Repairs.

Mansfield Corporation. [p. 646.]
Stoke-on-Trent Gas Department. [p. 644.]

Oils (Lubricating).

Sutton-in-Ashfield Urban District Council. [p. 643.]

Pipes, &c.

Barnoldswick Gas Department. [p. 646.]
Sutton-in-Ashfield Urban District Council. [p. 643.]

Trade Notes

"Staveley" Sand Spun Pipes.

The Staveley Coal and Iron Company, Ltd., Chesterfield, have forwarded us their pipe stock list for June and a recent publication dealing with the "Staveley" flexible joint which possesses the advantages of simplicity, flexibility, ease and speed of assembly, and capability of dismantling in the case of temporary mains.

Holophane Edgcumbe Auto-Photometers.

We have received a copy of the recent publication by Holophane, Ltd., Elverton Street, Vincent Square, S.W. 1, dealing with the Holophane-Edgcumbe Auto-Photometers, which, as their name implies, are of the self-acting type and measure the illumination that is being tested without the need of any visual comparison or setting.

Overseas Opportunities

Cyprus.

A commission agent and merchant established in Nicosia desires to secure the agencies of United Kingdom manufacturers of galvanized and black screwed and socketed gas tubes. (Ref. No. 486.)

Nova Scotia.

The Department of Overseas Trade has received an enquiry from a firm in Nova Scotia regarding their desire to receive prices and samples of copper tubes and fittings for domestic water supply purposes. (Ref. G.Y. 15,184.)

Stock and Share List follows page X.

STOCK AND SHARE LIST

Official Quotations on the London and Provincial Stock Exchanges

Issue. £	Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, May 31.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,551,868	Stk.	Mar. 11	7	7	Alliance & Dublin Ord. ...	130—140	...	138
374,000	,,	Dec. 17	4	4	Do. 4 p.c. Deb. ...	90—100	...	...
557,655	,,	Feb. 18	7	7	Barnet Ord. 7 p.c.	165—170	...	...
300,000	1	Apl. 8	1/4½	1/9½	Bombay, Ltd.	27/6—29/6	...	28/—28/3
178,480	Stk.	Feb. 18	9½	9½	Bournemouth sliding scale ...	220—230	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	167—172	...	169—172
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	147—152	...	150
50,000	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	86—91	...	90
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	125—130	...	...
357,900	,,	Feb. 18	7½	7½	Brighton, &c., 6 p.c. Con. ...	173—178	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	153—158	...	...
205,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	145—150	...	...
1,487,500	,,	Feb. 4	5	5	Bristol, 5 p.c. max. ...	121—123*a*	...	...
120,420	,,	Dec. 17	4	4	Do. 1st 4 p.c. Deb. ...	102—104*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	102—104*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	122—124*a*	...	...
855,000	,,	Mar. 11	7	8	British Ord.	155—160	...	156—158
100,000	,,	Dec. 17	7	7	Do. 7 p.c. Pref.	160—165	+2½	164½
350,000	,,	,,	5	5½	Do. 5½ p.c. "B" Cum. Pref.	114—119	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—102	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	111—116	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	Dec. 17	4½	4½	Do. 4½ p.c. Deb. ...	85—90	...	...
626,860	,,	Jan. 21	6	6	Cardiff Con. Ord.	130—135	...	...
237,860	,,	Dec. 17	5	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Feb. 4	5	6½	Chester 5 p.c. Ord.	111—116*b*	...	...
98,936	1	Mar. 25	2/-	2/-	Colombo, Ltd., Ord.	1⅞—1¾	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	20/6—22/6	...	...
609,204	1	Mar. 25	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	20/6—22/6	+·6	21/1½—21/9
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	26/—28/-	+·6	27/3—28/-
1,775,005	Stk	Feb. 4	5	6	Commercial Ord.	107—112	...	106½—109
475,000	,,	Dec. 3	3	3	Do. 3 p.c. Deb. ...	85—90	...	85—89
286,344	,,	Feb. 18	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
807,560	,,	Feb. 18	7	7	Croydon sliding scale... ...	155—160	...	...
569,590	,,	,,	5	5	Do. max. div.	112—117	...	114—117
620,385	,,	Dec. 17	5	5	Do. 5 p.c. Deb.	125—130	...	125
542,270	,,	Feb. 18	7	10	Derby Con.	185—195*c*	...	...
55,000	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	100—105*c*	...	...
239,000	,,	Feb. 4	5	5	East Hull Ord. 5 p.c. ...	108—113	...	...
181,625	,,	Feb. 4	6	6	East Surrey Ord 5 p.c. ...	131—136	...	133—134½
175,609	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
1,002,180	,,	Mar. 11	†	†7	European, Ltd.	112—117	+1	114—116
19,313,481	,,	Feb. 4	5⅞	5⅞	Gas Light & Coke 4 p.c. Ord.	27/3—28·3*f*	...	27/6—28/1½
2,600,000	,,		3½	3½	Do. 3½ p.c. max. ...	85—90	...	88½—90
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	104—109	...	107—109
6,102,497	,,	Dec. 3	3	3	Do. 3 p.c. Con. Deb. ...	88—93	...	89½—90½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—120	...	114½—117
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	111—116	...	114—115½
270,466	,,	Feb. 18	6	6	Harrogate New Cons. ...	135—140	...	...
140,000	1	Mar. 25	1/7½	1/7½	Hongkong & China, Ltd. ...	1¾—1⅞	...	...
213,200	Stk.	Feb. 18	6	6	Hornsey Con. 3½ p.c.... ...	128—138	...	136—137
5,600,000	,,	May 13	10	14	Imperial Continental Cap. ...	200—210	-5½	197—212
223,130	,,	Jan. 21	3½	3½	Do. 3½ p.c. Red. Debs.	91—96	...	...
285,242	,,	Feb. 18	8½	8½	Lea Bridge 5 p.c. Ord. ...	175—185	+3	180
2,167,410	,,	Feb. 18	6	6	Liverpool 5 p.c. Ord.... ...	140—144*b*	...	137
245,500	,,	Dec. 17	5	5	Do. 5 p.c. Red. Pref. ...	105—110*b*	...	...
306,083	,,	Jan. 16	4	4	Do. 4 p.c. Deb.	104—107*b*	...	...
165,736	,,	Feb. 18	8	10	Maidstone 5 p.c. Cap. ...	185—195	...	...
63,480	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	83—88	...	...
75,000	,,	May 27	†10	†10	Malta & Mediterranean ...	210—220*	+5	...
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	100—105	...	...
231,978	Stk.	Feb. 4	5	5	M. S. Utility "C" Cons. ...	110—115	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	105½
360,075	,,	Dec. 17	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
148,955	,,	,,	5	‡5	Do. 5 p.c. Deb. ...	125—130	...	...
125,000	—	Jan. 2	11/8	3½	Do. 3½ p.c. Rd. Rg. Bds.	99—102	+1	...
675,000	,,	May 28	†6	††3	Montevideo, Ltd.	50—60	...	50½—52½
2,061,315	,,	Feb. 18	5	5⅝	Newcastle & Gateshead Con.	26 3—27/3*df*	...	26/9
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	106—107*d*	...	...
776,706	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb. ...	101½—102½*d*	...	...
277,285	,,	Oct. 8	5	5	Do. 5 p.c. Deb. '43 ...	105—107*d*	...	...
274,000	,,	Feb. 4	5	5	Newport (Mon.) 5 p.c. max....	115—120*a*	...	...
225,000	,,	Feb. 18	7½	7½	North Middlesex 6 p.c. Con.	165—175	+4½	174
396,160	,,	Feb. 4	5	5	Northampton 5 p.c. max. ...	105—110	...	...
300,000	,,	Apl. 29	†9	†7	Oriental, Ltd.	167—172	...	...
416,617	,,	Dec. 17	8	8	Plym'th & Stonehouse 5 p.c.	165—170	...	...
504,416	,,	Feb. 4	8	8½	Portsm'th Con. Stk. 4 p.c. Std.	175—180	...	...
241,446	,,	,,	5	5	Do 5 p.c. max. ...	110—115	...	...
114,000	,,	Jan. 21	5	5	Preston 5 p.c. Pref.	108—113	...	...
1,736,968	Stk.	Feb. 18	6	6	Sheffield Cons.	142—144*e*	...	...
95,000	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	103—106*e*	...	...
133,201	,,	Feb. 18	8½	5	Shrewsbury 5 p.c. Ord. ...	142—147	...	...
90,000	10	May 27	‡3	‡3½	South African	3—4*	...	...
1,061,779	1	May 13	1/2‡	1 2‡	South East'n Gas Cn. Ld. Ord.	27/—29/-	...	27/10½
845,016	1	Mar. 11	-/10½	- 10½	Do. 4½ p.c. Red. Cum. Pref.	22/—23/-	...	22/6—23/-
450,000	Stk.	Feb. 4	74/4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	...
6,709,895	,,	Feb. 4	5	6½	South Met. Ord.	130—135	...	130—132
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	147—152	...	150
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	104—109	...	107½
1,895,445	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	87—92	...	87½—89½
1,000,000	,,	Jan. 7	5	5	Do. 5 p.c. Red. Deb....	113—118	...	...
209,820	,,	Feb. 18	8½	8½	South Shields Con.	174—176*d*	...	...
1,543,795	,,	Feb. 18	6	6	South Suburban Ord 5 p.c. ...	130—135	...	130—131½
512,825	,,	,,	5	5	Do. 5 p.c. Pref. ...	121—126	...	...
500,000	,,	,,	4	4	Do. 4 p.c. Pref. ...	102—107	...	106—109
888,587	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ..	124—129	...	127
250,000	,,	,,	4	4	Do. 4 p.c. Deb. ..	103—108	...	...
647,740	,,	Feb. 4	5	5	Southampt'n Ord. 5 p.c. max.	114—119	...	...
121,275	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	102—107	...	...
350,000	,,	Feb. 4	5½	5½	Swansea 5½ p.c. Red. Pref. ..	115—120	...	117½—118
200,000	,,	Dec. 17	6½	6½	Do. 6 p.c. Red. Deb. ..	100—105	...	...
1,076,490	,,	Feb. 18	6‡	6‡	Tottenham and District Ord.	148—153	...	149—151
409,835	,,	,,	5½	5½	Do. 5 p.c. Pref. ...	131—136	...	133½
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ..	120—125	...	...
199,005	,,	Dec. 3	4	4	Do. 4 p.c. Deb. ..	103—108	...	...
369,774	,,	Feb. 4	7	7	Uxbridge, &c., 5 p.c.	150—155	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ..	118—123	...	...
1,326,700	,,	Feb.	7	7	Wandsworth Consolidated ...	155—160	...	156—158
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	121—126	...	124½
1,317,964	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	126—131	...	...
208,300	,,	,,	26/8	4	Do. 4 p.c. Deb. ...	104—109	...	...
158,400	,,	Feb. 18	5	6‡	Winchester W.& G. 5 p.c. Con.	116—121	...	...

Quotations at :—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of Stock. *g.*—Paid £3, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year.

STOCK FOR SALE BY TENDER.

By Order of the Directors.

LOWESTOFT WATER AND GAS COMPANY

Messrs. A. & W. RICHARDS

are Instructed to OFFER FOR SALE BY TENDER

£35,000

FOUR PER CENT. PREFERENCE STOCK.

Minimum Price of Issue, Par.

Prospectus and Form of Tender (which latter must be sent in by 12 o'clock noon on Friday, 14th June) may be obtained of A. & W. RICHARDS, 37, WALBROOK, E.C. 4.

COMPANY NOTICES.

WINCHESTER WATER AND GAS COMPANY.

NOTICE is Hereby Given that the 4 PER CENT. and 5 PER CENT. IRREDEEMABLE DEBENTURE STOCK REGISTERS of the Company WILL BE CLOSED from the 21st day of June, 1935, to the 30th day of June, 1935, both days inclusive.

By order of the Board,
W. D. WALKER,
Secretary.

90, High Street,
Winchester,
June 5, 1935.

UXBRIDGE, MAIDENHEAD, WYCOMBE, AND DISTRICT GAS COMPANY.

NOTICE is Hereby Given that the DEBENTURE TRANSFER BOOKS WILL BE CLOSED from the 15th to the 29th June, both days inclusive, and the Interest Warrants will be paid on the 1st July next to the Debenture Holders registered at the date of closing.

By order of the Board,
GEORGE J. BRISTOW,
Secretary.

June 6, 1935.

ASHWORTH & PARKER LTD
RIVERSIDE WORKS
BURY · LANCS
STEAM ENGINES
FOR CONSTANT AND
SATISFACTORY SERVICE

MAINLAYING

E. E. JEAVONS & CO., LTD.,
Gas Engineers and Mainlayers,
TIPTON, STAFFS.

BROADBENT'S
SLAG WOOL
THE WORLD'S FINEST
FIRE-PROOF NON-CONDUCTING
material for
GAS PLANT
of every description

J. C. BROADBENT & Co., LTD.
SLAG WOOL WORKS
REDCAR, YORKS
36, BASINGHALL ST.
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FEET

POSTIE'S PUNCTUAL FEET

— CARRYING GOOD TIDINGS TO YOU — FOR WHEN IT COMES TO THE MEASUREMENT OF **CUBIC FEET OF GAS THE "A E M" OPTIONAL METER**—NOW A PROVED SUCCESS—IS READY FOR ***IMMEDIATE DELIVERY.***

ALDER & MACKAY LIMITED

EDINBURGH · LONDON
BRADFORD & BRANCHES

TEL. ADDRESS: "TOOLS DENTON LANCS" TELEPHONE 2038

E. PASS & COMPANY,

TOOLS FOR GAS AND WATER WORKS — GAS & WATER ENGINEERS UNDERPRESSURE SPECIALISTS — BRASS AND IRON FOUNDERS

Station Works, DENTON, LANCS.

The SOUTHSEA GAS OVEN
for Hotels, Pie-Makers, Bakers and Confectioners

Showing No. 2 Model.

Strong and Serviceable
Efficient and Economical
Cannot back-fire
All ovens made sectional
Competitive prices, carriage paid
Liberal trade discounts
Free literature

Showing 5150 prov. patent non-back fire gas cock and air regulator fitted to all ovens.

T. ERRINGTON & SONS, Manufacturers,
SOUTHSEA WORKS, PORTSMOUTH

WILLIAM PRESS & SON
38, OLD QUEEN ST., LONDON, S.W.1
MAINLAYING and GASWORKS CONSTRUCTION.
See illustrated advertisement May 29, p. 475.

ERECTION WORK
GAS HOLDERS. OIL TANKS. STEEL BUILDINGS. CAST IRON TANKS. PURIFIERS. MAIN LAYING. PAINTING.
Sub-Contractors for any Erection Work.
REPAIRS, RE-SHEETING, DISMANTLING, & RE-ERECTION, INSPECTIONS.
S. CROOKSTON & CO.
Contractors
EDGEHILL 43. HORNTON, BANBURY, OXON

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